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An Evaluation of the Administrative Computing Structures and Practices Supporting School Office Computer Use

by

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The undersigned certify that they have read, and recommended to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled An Evaluation of the Administrative Computing Structures and Practices Supporting School Office Computer Use submitted by David Gordon Buzzacott in partial fulfillment of the requirements for the degree of Master of Education.

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Abstract

This study was designed to help understand and describe what impact current school administrative computer training, support structures, and practices are having on school office computer users. An effort was made to understand how the process of technological change is currently being managed, and to identify from the school office computer user's point of view those aspects which have become important concerns and issues with respect to the computerization of school offices. In addition, recommendations are made in order to deal with those concerns and issues arising out of the research data.

Data from three school jurisdictions is examined, focusing on existing structures and practices presently utilized in the areas of support services, change, and training. With respect to support services, the areas of existing structure and practice, school experience with support services, informal support, and strengths and weaknesses are examined. In looking at change, the following areas were examined: central office support, communication, school input into the change process, increasing expectations, and attitudes towards computerization. In examining training, the study deals with the jurisdictions' approach to computer training, the issue of school-based administrative training, and the training of school secretarial staff.

The study identifies areas of concern and offers broad recommendations for practice with the aim of assisting jurisdictions to deal effectively with school-based administrative computing.

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Chapter 1

Overview of the Study

Introduction

Hoy and Miskel (1982), in a discussion of educational administrative decision-making, stated that "decision-making is a major responsibility of all administrators. It is the process by which decisions are not only arrived at, but implemented" (p. 264). One of the key elements required for effective decision-making is easy and quick access to current relevant data. As a result of rapidly changing pressures both from without and within education, school administrators have been confronted by an ever increasing need for accurate, up-to-date information in order to make wise management decisions.

Pressures resulting from reductions in educational financing, declining school enrollments, societal demands for accountability, and demographic shifts leading to school closures have required that school administrators have access to current information in order to deal effectively with many of these concerns. Manual methods of data management, storage, and retrieval are being replaced by the personal computer in order to meet the needs of the modern school administrator. Bluhm (1987) indicated:

> The management and operation of today's schools have become increasingly difficult. Economic and social factors have affected schools adversely. Rising costs, dwindling enrollments, demands for accountability of staff and programs, and constant requests from regulating agencies for information and reports have compounded administrators' responsibilities. Confronted with the tasks of keeping schools operating within the boundaries of goals and expectations set for them and the financial resources available, administrators have turned to computer technology and computer based information systems. (p. 4)

In the wake of the introduction of computers into school offices, questions have arisen regarding the utility and effectiveness of the structures and practices which support the technology. While not all inclusive, structures and practices refer to supporting departments, training, training methods, types of support and means of providing service.

In addition, the effectiveness of the traditional approach to the process of technological change needs to be questioned.

Statement of the Problem

The purpose of this study is to better understand and describe what impact current school administrative computer training and support structures and practices are having on school office computer users, to understand how the process of technological change is currently being managed and to identify, from the school office computer user's point of view, those aspects which have become important concerns and issues with respect to the computerization of school offices. In addition, recommendations will be made to assist administrators to deal with those concerns and issues arising from the research literature. The following questions served as guides to the purpose of the study.

1. What training and support services are presently provided by school district data processing departments and to what extent do these services meet the needs of school-based computer users?
2. What are the concerns of school office computer users with respect to provision of training and support services?
3. How do existing school district data processing departments plan for and manage technological change, and what input is accorded to those who must implement the change?

Justification for the Study

The movement to computerize school offices is a recent phenomenon which has arisen in response to demands by central office administration within school jurisdictions for immediate access to accurate up-to-date information. In order to implement the computerization of school offices, there is a need for flexible structures and practices designed specifically to support the technology and an increasing number of new users. As school systems begin to implement computer technology in the school office, they are

confronted by the need to provide training, consulting services, and maintenance and support of hardware and software.

Schools are beginning to take more responsibility for the data maintenance and operation of their own computer information systems. This decentralization of computer use has resulted in traditional data processing departments having to plan and communicate with a new clientele with a wide variety of needs, skills, and abilities. To date, there has been little research into how effective these efforts have been and little understanding of the impact that current educational data processing department support structures and practices are having on the computer users in school offices. In addition, there is little information on how effectively data processing departments are managing change. This study will examine these areas of concern and the investigator will make recommendations for practice.

This study is of theoretical and practical significance and should be of interest to school office computer users, data processing management, and central office administration. It is of theoretical significance because it yields insight into an area in education which is undergoing rapid change and, in addition, contributes to the much broader literature on technological change. The study is of practical significance in that it identifies those areas the participants felt tended to inhibit or enhance the process of computerization of the school office. The study may also serve to assist those who are involved in the planning and provision of support services for school-based computer users. This is accomplished by having the users reflect upon their own situation and identify areas in their own structure and practice that may need to be changed in order to more effectively meet the needs of those who depend on their services.

Definition of Terms

The following terms are defined to assist the reader.

Data processing department: The department of a school district organization which is responsible for the management and operation of computerized systems.

Dedicated phone line: A telephone line that is used solely for computer communications.

End user: Any school administrator or secretary who uses a computer or its products in the performance of his/her job.

Intelligent work station: A computer capable of utilizing software applications necessary for processing and updating office records.

Office computer users: Those individuals who work in a school office and whose job requires the use of a computer.

Prototyping: A procedure in which a simulation of the final product is created and tested before the actual product is built. The prototype may be a collaborative effort between the program developer and end user (Martin, 1984).

Assumptions

A major assumption in this study was that many of the theories and practices developed to explain and deal with issues emanating from the business sector with regard to computer use and technological change are transferable and applicable to the educational context. In addition, it was assumed that the information provided by the interviewees was an accurate reflection of their feelings, opinions, and experiences regarding school office computerization.

Limitations

Much of the literature and research referred to in this study comes from theory and practice which was developed to understand and deal with issues arising with respect to computer use in the business context and therefore may have limited applicability the school office context.

The small sample size and the manner in which the sample was selected may limit the application and the scope of the recommendations of the study. In addition, the method of sample selection and the policies in some jurisdictions may have unintentionally resulted in the selection of a preponderance of school administrators who are supportive of the

computerization of the school office. Readers are encouraged to decide for themselves if sufficient similarity exists between the context of this study and their own situations.

As a result of being the first to implement computers in the school office setting, secondary school computer users may express different needs than their counterparts in elementary schools. As a result, the relevance to differing contexts may be limited.

Delimitations

The study was delimited to those school districts which were large enough to have computerized data processing departments and which could support computerized school-based information systems. In addition, it was required that only those school districts which provide computer training and support services to their school-based users be part of the population from which the sample would be selected.

Organization of the Thesis

Chapter 1 introduced the purpose and objectives of the study. In chapter 2 a review of the current literature related to the study is presented. The methodology, research procedures and data collection techniques used in the study are outlined in chapter 3. Chapters 4, 5 and 6 provide a statement of the findings obtained as a result of a content analysis of the interview data. Chapter 7 highlights the themes that emerged from the content analysis. In chapter 8, the final chapter, recommendations for practice are presented.

Chapter 2

Review of Related Literature

Introduction

Before dealing with the related literature, it is important to mention that a substantial amount of the relevant literature dealing with administrative uses of computer systems comes from business or post-secondary educational sources. Thus, caution must be used when applying the relevant literature to the context of public education. In addition, the writer relied heavily on the literature which focuses on change, within both business and educational contexts. Where appropriate, the findings were applied to the introduction of computer systems in school offices.

The use of personal computer technology in the school office context for administrative purposes has been a relatively recent phenomenon. Personal computers promise to have a major impact upon the way in which school office personnel do their job, the manner in which information is exchanged, and social interactions and relationships between employees. Martin (1984), in discussing the problems experienced in organizational data processing, pointed out that "there are all manner of decisions being made every day in an organization by managers high and low. Most of these decisions need information, the best information possible" (p. 9). Millar (1988) discussed school administrative uses of personal computers and the advantage of computer use by the school administrator and indicated that "an administrator's decision-making process is greatly enhanced by having quick access to more data" (p. 11). Until recently, schools have had to rely largely on manual methods of data management, storage, and retrieval to access the information necessary to make decisions. With the falling cost of personal computer systems and the realization that continued reliance on manual methods of information management and centralized reporting are insufficient to meet today's needs, school boards and their staff have turned to the computer to assist them in the provision of their information needs.

Background

The introduction of personal computers into the school office was an important step toward providing school personnel with the necessary, accurate, up-to-date information in order to make wise management decisions. Bluhm (1987), in discussing the administrative uses of computers in the school, noted that "computers are well suited for information processing tasks because of their speed, accuracy, and ability to store large quantities of information in an accessible form" (p. 1). It is these characteristics which attracted school boards to consider using personal computers in the overall management of information. Until recently, larger school boards have maintained information on centrally located mainframe computers. Beginning in the 1950s, these mainframe computers were used for administrative data processing, including student scheduling, grade reports, budget accounting, payroll, and inventory lists (Bluhm, 1987). The data to be stored was largely determined by central office personnel, with the job of storage, maintenance and reporting of information being the responsibility of the data processing department. Schools were primarily responsible for the manual collection of the data, which was then submitted to the school district central office for data entry and processing. In order to receive reports, schools were obliged to submit a request which was then processed at the school district central office. Often the time period from the beginning of data collection to finally obtaining the necessary report was too long. As a result of the slow data processing, reports were frequently inaccurate and outdated by the time they were received by the administrators. This problem was partly solved with the advent of the ability to communicate with the central office mainframe computer through a computer terminal in the school. With the development of appropriate software, schools could begin to enter their own data on-site at the school. As schools gained more autonomy and increasingly became more responsible for budgetary decisions, the need for rapid access to accurate up-to-date

information became apparent. Bluhm (1987) further indicated:

> The management and operation of today's schools have become increasingly difficult. Economic and social factors have affected schools adversely. Rising costs, dwindling enrollments, demands for accountability of staff and programs, and constant requests from regulating agencies for information and reports have compounded administrators' responsibilities. Confronted with the tasks of keeping schools operating within the boundaries of goals and expectations set for them and the financial resources available, administrators have turned to computer technology and computer based information systems. (p. 4)

In addition, local pressures resulting from reductions in educational funding in the early 1980s, fluctuating school enrollments, societal demands for accountability, the trend towards school-based budgeting and demographic shifts leading to school closures have emphasized the need for schools to have immediate and easy access to accurate up-to-date records in order to manage day-to-day operations. At about this time, personal computers and related software were increasing in power, to the point where schools were beginning to make use of them for some administrative functions. Millar (1988), in discussing the advantages of the computer for school administrative reporting, stated that "the personal computer's storage capacity, its accessibility to stored information, the accuracy of its stored information, and the small likelihood of the loss of any record underscore the suitability of the personal computer for record keeping of any kind" (p. 31). In addition to these characteristics, the potential of personal computers to communicate with larger mainframe computers and with other personal computers through local area networks made information sharing possible and enhanced the usefulness of personal computers as administrative tools. Further technological developments are increasing computer speed and ease of access to information. Distributed processing, while still in its infancy, is gradually freeing schools from depending on the central office mainframe computer and allowing schools to process data locally, on-site, and then later share it with central office. The rapid speed and large storage capabilities of today's personal computer systems, coupled with their ability to share and exchange data with other computers has made personal computers ideally suited to carry out many school office administrative tasks.

Many school jurisdictions are contemplating, or have already embarked on, the computerization of their school offices. To accomplish computerization means not only installation of computer hardware and software, but also the necessary infrastructure to support its use. The flexibility and power of personal computer systems, the development of reliable peripheral devices to connect them to existing mainframe computer systems, and the ability to adapt the technology to meet the unique and particular needs of individual schools have provided school systems with the potential of solving many of their current information problems.

The Nature of the Technology and a New Approach to Change

The process by which schools implement new computerized information systems is critical to the successful use of the new technology. Traditional approaches to change in education have emphasized the length of time required to bring about the institutionalization of an innovation. Hord, Rutherford, Huling-Austin, and Hall (1987), in discussing change within the education context, indicated that "change is a process and not an event" (p. 5). They elaborated by stating that "we now know that change is a process occurring over time, usually a period of several years. Recognition of this is an essential prerequisite of successful implementation of change" (Hord et al. 1987, p. 6). In addition, Fullan (1984), in an analysis of studies of efforts at educational change, commented on the time required for the process of change. He indicated that "the total time frame from initiation to institutionalization is lengthy; even moderately complex changes take from three to five years" (p. 41). For most innovations occurring in the education context, allowing adequate time for the process of change to occur is not as much a problem as it is with the introduction of school office computers. This technology is changing so rapidly that it does not stay static long enough to mature. This constant state of rapid development yields new technologies that no sooner having been introduced into the market place are made obsolete or inferior by new and improved versions already in development. The dynamic nature of this technology, coupled with its lack of maturity, precludes any one form or

expression of the technology persisting long enough to enter the institutionalization phase envisioned by traditional approaches to change. Radin and Greenberg (1983), in discussing the problems of outdated computer technology, noted that:

> Because improvements in computer technology seem to be a constant, the question of [the equipment] becoming outdated even before personnel have become proficient in using [it] ...continues to plague those who are charged with the responsibility for making the investment of dollars for such equipment. (pp. 4-5)

Selection or development of appropriate hardware and software and the provision of adequate training and support poses real problems for those dealing with this rapidly changing technology. Many traditional managers act as if technological change has a well defined beginning and end, but this approach is inappropriate when dealing with computerization. Mankin, Bikson, Gutek, and Stasz (1988), in discussing the findings of three studies from the Rand Corporation dealing with technological change in the business sector, stated:

> One of the most important characteristics of new technology is the chaotic pace at which new features, capabilities, and applications emerge. The pace of technological innovation and the uncertainty of predicting its specific form and its impact requires an organizational process of change that is as dynamic and flexible as the technology itself: (p. 69)

In light of this, one might question whether the use of traditional approaches to the process of change is adequate. Mankin et al.(1988) indicated there is a need for an approach to change which "stresses the inherent flexibility of the technology and its social/behavioral dimensions--how it is to be used, by whom, for what purposes. Mutual adaptation of technology to user and vice versa is the hallmark of this approach." In reflecting about the ongoing patterns in technological change Mankin et al. (1988) envision an implementation process involving:

> Successive waves of organizational change that may dramatically alter the technologies, designs, and solutions left in the wake of preceding waves. Furthermore, this continuing process is an interactive one that involves the participation of the users who will be most affected by the change. (p. 80)

Thus there is a need for a cooperative orientation to change that not only accepts change but encourages it as part of a natural ongoing process.

Kiesler and Sproull (1987), in discussing the process of technological change in organizations, commented on the infrastructure necessary to support a new technology by stating that:

> To introduce new technology or modify old technology requires change in three areas: resources, behavior and attitudes. Changing resources means changing the built technology and creating its necessary infrastructure. The necessary infrastructure of computing includes allocations of time and money, service people, teachers, physical space, computing procedures, and organizational units. Changing behavior means learning to use the new technology. It also means supporting and fostering new technology and acting to introduce it in specific areas. Changing attitudes means coming to believe that the new technology is instrumental to one's work and life. (p. 30)

The infrastructure necessary to support change must be flexible, allow for the changing needs of the organization, and possess the flexibility to adapt a rapidly changing computer technology to the users and the users to the technology. It is the dynamic nature of the new technology which requires organizations to rethink their philosophy of change and adapt or change their existing structures and practices in order to deal effectively with the new reality. No longer can organizations hope to find the "right system, install it, provide training for it, and never change" (Mankin et al. 1988, p. 80).

Once decisions have been made regarding the design of the new system, administrators traditionally tend to think that much of the work is complete and all that remains is to put the new system into place. Very little consideration is given to the social/behavioral contexts into which the innovation is to be introduced. From the analysis of a variety of studies of organizations ranging from industrial factories to business institutions, Dalziel and Schoonover (1988) examined the factors that produce successful planned change and concluded that "changes suit the change makers, not necessarily the people who have to live with them" (p. 4). In addition, Fullan (1982) indicated that:

> One of the basic reasons why planning fails is that planners or decision-makers of change are unaware of the situations which potential implementors are facing. They

> introduce changes without providing a means to identify and confront the situational constraints, and without attempting to understand the values, ideas and experiences of those who are essential for implementing any changes. (p. 83)

If user needs are to be truly met, there must be opportunity for ongoing interaction between user and developer. Dalziel and Schoonover (1988) stated that "understanding the needs of the end user is one of the most important keys to overcoming resistance to change." Martin (1984), in discussing traditional approaches to computer application development, indicated that the use of "traditional techniques for application development tend to build a wall between the application user and the application creator; the programmer is kept away from the end user" (p. 48). Dalziel and Schoonover (1988) pointed out that "a basic axiom of any change effort is that the further away the people defining the change are from the people who have to live with the change, then the more likelihood that the change will develop problems" (p. 59). Each must help the other and together developer and user begin a dialogue which builds toward a common understanding of each other's needs. In this way users become more knowledgeable about the capabilities of the system and developers gain a better understanding of the problems faced by those implementing the innovation. Allowing end users, those most affected by change, to be involved in the planning process not only can serve to enhance commitment to the change but also helps bring about a better understanding of the change. In addition, providing for end user involvement sets the tone for the adoption of future ideas and innovations and results in a change that is often better suited to the needs of the end users. Watts (1987), in an analysis of effective management principles utilized at IBM, stated that the involvement of those most affected by a change in the planning process "allows them to better understand the change, to see why it is being made, and to learn what to expect. This reduces the unknowns and helps overcome resistance" (p. 185). User involvement is important in developing computer programs and systems that users will be able to operate successfully. This involvement promotes a feeling of ownership and results in a stronger commitment to making the proposed change work (Mankin et al. 1988). This is

particularly important when designing and introducing highly technical changes such as the computerization of school offices. Dalziel and Schoonover (1988) pointed out that "the lure of technology often causes people to create elegant systems that do not serve the needs of the people who have to live with them" (p. 35). It is the failure to understand the needs of those who will use these systems and the end users' lack of opportunity for input into the planning and the implementation process that result in the development of inadequate systems, lack of end user commitment, and resistance to the proposed change. Marris (1986) stated that:

> When those who have power to manipulate changes act as if they have only to explain, and when their explanations are not at once accepted, shrug off opposition as ignorance or prejudice, they express a profound contempt for the meaning of lives other than their own. (p. 155)

In addition, Fullan (1982) indicated that:

> Innovators who are unable to alter their realities of change through exchange with would-be implementors can be as authoritarian as the staunchest defenders of the status quo. This is not to say that innovators should not have deep convictions about the need for reform or should be prepared to abandon their ideas at the first sign of opposition. It is to say that...innovators need to be open to the realities of others: sometimes because the ideas of others will lead to alterations for the better in the direction of change, and sometimes because the others' realities will expose the problems of implementation which must be addressed and at the very least will indicate where one should start. (p. 82)

Those involved in the planning and development of change and those who will be most affected by it need to maintain open lines of communication and opportunities to share ideas in order that the new system, and any future modifications, might meet the needs of all concerned.

Training

Based on an analysis of the experiences of a variety of organizations introducing technological innovations, Evans and Wilkinson (1983) stated that "clearly the quality of training provided is a critical part of the change process and requires careful planning at the outset" (p. 25). Many failures in the area of planned change can be directly attributed to not only the quality of the training, but also to a general lack of attention to the training of users

of the new technology. In support, Dalziel and Schoonover (1988) commented that "most total failures in planned change can be linked to little or no training" (p. 118). Staff training is part of the infrastructure necessary to support technological change and is essential in assisting school office staff in learning to use new programs and computer equipment. When new systems are introduced, training is essential. Martin (1984) concurred with this and stated that "end users need much training and hand holding in adapting to new systems" (p. 54). Flynn (1988), based on the report of the findings of the Lowell labour market study and an analysis of the findings of 200 enterprise-level case studies commented on the training of end users by indicating that "training is one of the most significant problems facing employers who are involved with the adoption of technologies that have not yet matured" (p. 56).

The computer, its programs, and peripherals are very much a part of an immature technology. The difficulty in dealing with this type of technology is that there are continual improvements, updates and changes to the product, requiring ongoing training in order to keep users current and able to take advantage of recent enhancements and modifications. As schools and school boards attempt to introduce computers into school offices, they must not only provide users with the necessary initial training to get the users started but must also decide how to deal with the ongoing need for training the users.

Questions regarding who should be trained, how often, and when and where training should be given are all important and need to be considered by those involved in implementing change. As schools progressively become more computerized, administrators who are unskilled in the use of computers become increasingly dependent on the skills of a relatively few trained school support staff. As a result, there is an increasing risk that untrained school administrators will become locked out of a system they have become dependent upon and unable to access the information they need for day-to-day operations. This is likely one of the reasons why some school boards have encouraged school

administrators to obtain a basic understanding of their computer systems and to acquire simple computing skills in the event their support staff are unavailable.

While training is needed for the primary person in charge of data management in the school, usually the secretary or business manager, there is also a need for the training of members of the school administrative team. Miller (1988) stated that "administrators must strive to become at least minimally literate in the use of the new electronic tools" (p. 14). In addition, Radin and Greenberg (1983) stated that "to make educationally sound decisions regarding the acquisition and utilization of computers, it is essential that administrators and supervisors develop some degree of proficiency in computer literacy" (p. 6).

School administrators need some knowledge of strengths and weaknesses of their computer systems in order to make sound decisions regarding the utilization of computers within the school office. While administrators need not become programmers or computer experts, they should possess some knowledge of their school's system in order to maximize the computer's potential and when required, be able to operate the computer and the applications necessary to effectively manage the school.

Montgomerie and Richards (1988), in discussions regarding the use of integrated computerized administrative packages, noted that school administrators "feel there is a lack of opportunity to learn how to use such packages both before and after they are purchased" (p. 2). This concern is particularly important as school systems usually intend to mandate the use of the technology once it is in place. Without providing adequate training for staff, school boards may set expectations for the technology which is unrealistic because the staff simply do not have the skills to meet these expectations. The claim by school administrators of a lack of opportunity to learn about their systems needs to be examined more closely and should be of major concern to the central office administration.

Hord et al. (1987) indicated that "a single, generalized training session prior to a new program's initial use is rarely adequate to ensure effective implementation no matter how 'comprehensive' or 'in depth' it is advertised to be" (p. 76). In discussing training,

Dalziel and Schoonover (1988) indicated that "successful organizations employ a variety of educational strategies" (p. 119). Further, Mankin et al. (1988), commenting on the findings of three studies by the Rand Corporation, indicated that:

> The most successful training programs we found featured an eclectic mix of resources and procedures that can be adapted to employees' widely varying interests and skill levels. This approach has the added advantage of being able to accommodate the varying rates at which users' needs and skill levels change. (p. 76)

The need for a variety of educational strategies and a mix of resources and procedures that can be adapted to employees' widely varying interests and skill levels supports the notion that change is very much a personal experience and that any training must reflect this. Though it is possible that all employees may initially start at roughly the same point, as time passes they develop different areas of interest, attain varying levels of skill, and require different interventions in order to effectively meet their needs. Training programs should reflect these realities. When commenting upon training programs, Dalziel and Schoonover (1988) stated that "the most successful programs meet everyone's needs" (p. 118).

Communication

In order that the implementors of change might work towards a smooth introduction of computer technology in school offices, they need to pay attention to the area of communication. Many barriers to change exist that tend to inhibit the process of implementation and the acceptance of an innovation. Watts (1987) indicated that "every change involves unknowns, and people are reluctant to take risks" (p. 185). This reluctance to take risks is one of the key areas the effective change agent must work to overcome. Commenting on resistance to change, Dalziel and Schoonover (1988) stated that:

> People resist change for a variety of reasons. Some people's previous negative experiences teach them that change is hazardous and harmful. Others may not see the rationale for change; they are content with the status quo. Others resist because

> the reasons for change are not clearly communicated to them. They have no logical basis for accepting a different way of operating. (p. 32)

In addition, Connor and Lake (1988), in a review of the management of organization change, pointed out that "change targets may resist because they simply do not understand the need for change, the substance and details of the change, and the consequences of the change" (p. 119). In this regard Dalziel and Schoonover (1988) commented that "the most effective leaders recognize that the objectives for change must be clearly communicated" (p. 32). The importance of clear effective communication between the planners of change and those who will be most affected by a proposed change can not be underestimated. Good communication not only serves to lay out for employees the intended direction in which the organization is intent on moving but also provides an opportunity for clarification of misunderstandings and explanation of how end users will be affected. It also allows for a better understanding of the proposed change by all concerned. With regard to communication, Evans and Wilkinson (1983) stated that:

> Rather than simply introducing technological change as a management decision, many firms make special efforts to provide as much information as possible to staff about the equipment with the objective of "selling" the idea to them and gaining their early commitment. Indeed many companies stress the importance of a good communications system in influencing employee attitudes to technological change. It is also important that the information provided should give as wide a picture as possible of future plans as well as detailing immediate changes so that employees may be encouraged to accept change as a normal and continuing process.(p. 35)

Carlson, cited in Peters and Waterman (1982) in a popular review of successful organizations, succinctly stated that "nothing is worse for morale than a lack of information down the ranks" (p. 267). Part of the problem associated with poor communication relates to the selection of planning and implementation team members. Dalziel and Schoonover (1988) noted that "change projects depend on a mix of people and skills for success. Some project teams have members with tremendous technical talent, but fail because they lack someone with people skills" (p. 36).

This problem is characteristic of highly technical changes such as the introduction of computer systems. Part of providing a clear understanding of the nature of proposed

change is ensuring that the those individuals doing the communicating deal with the concerns of end users and do so in concrete terms and in a language that is meaningful to the listeners. It is thus important that those charged with the responsibility of communicating the change have excellent people skills and be effective communicators. Communication must reflect the culture of the users and the change agent must be careful to use words that are clearly understood by the change targets. Connor and Lake (1988) indicated that:

> Some of the lack of understanding by the targets of the change is not intellectual as much as cultural. A change agent may explain the change and plan for it from the point of view of a culture that is "foreign" to the change targets. Using words that come from the change agent culture will not satisfy the targets' needs to know what is taking place. (p. 119)

Dalziel and Schoonover (1988) indicated that "competent experts present complex ideas in terms related to end users' concerns. They not only make sure that language is tailored to the audience, but also take into account how the audience learns or absorbs concepts" (p. 91). Thus the planned change, its reasons, and objectives must be translated into terms that make sense to those who will be most affected by it. The need to tailor communication to the audience is not intended as insult but rather emphasizes a need to ensure that all barriers to effective communication are removed.

Support for change

Schools typically are confronted by a multitude of proposed changes, many of which are poorly planned, under funded, and lack the necessary central office support to be successful. There is a tendency on the part of school administration to take a wait and see attitude towards any change and only commit themselves to it when they are convinced there is strong central office support and adequate financial resources committed to see the change through. Dalziel and Schoonover (1988) indicated that:

> Support of top management is critical at the initial stages of planned change and important throughout the process. Upper-level alliances provide tangible support in the form of resources for various phases of the project and intangible support in the form of sponsorship and networking....We also found that the behaviors of top

> management were a key factor in determining the success of planned innovation. For example, in the most successful change projects, top management actively participated in solving problems throughout the life span of the process. (p. 17)

The need for top management to be committed to the change, take an active role in problem solving and provide adequate resources to support the innovation is essential if the change is to be successful.

Commitment to change is also costly in terms of the personal commitment required of those who are affected by the change. Regarding the costs of innovations, House (1974) stated that:

> The personal costs of trying new innovations are often high, however, and seldom is there any indication that innovations are worth the investment. Innovations are acts of faith. They require that one believe that they will ultimately bear fruit and be worth the personal investment, often without the hope of an immediate return. Costs are also high. The amount of energy and time required to learn the new skills or roles associated with the new innovation is a useful index to the magnitude of resistance. The necessity of relearning acts as a deterrent. (p. 73)

Computer Support Services

As the installed technology ages, equipment and software require up-dating and modification. Relatively highly skilled maintenance and repair is often required. In order to meet these needs, computer service personnel are required. This type of work is either subcontracted out to the original hardware and software vendors, provided in house by the school jurisdiction, or is dealt with by some combination of both. When this service is provided by a school board, it is usually through a structure which is part of the data processing department or works in cooperation with that department. Such a department is an essential part of the infrastructure necessary for the successful implementation, institutionalization and ongoing development of computing within the school office.

Danziger and Kraemer (1986), in their analysis of research in the use and impacts of the computer in American local governments, indicated that "problems with computing services involve...difficulties...in receiving desired computing support in a timely and efficient manner" (p. 111). Problems in receiving prompt attention are rarely experienced during the early period of implementation. Usually computerization is phased in over time

and it is not until a significant number of schools have been added that a deterioration in service is noted. Such a decrease in promptness of service may be due to inadequate staffing and under financing of support services. As computer use grows and demand for service increases, there must be a corresponding growth in support services in order to maintain the level of service. In addition, new machinery usually requires minimal service but as time passes there is bound to be an increase in the need for maintenance and repair. If there is a lack of attention to the area of support services and schools are not receiving the kind of service they require, boards are likely to find a growing disenchantment and frustration with the newly installed system, increased user resistance, and more difficulty obtaining support for future innovation. The support services group helps end users become better informed about their computer systems and plays an important role in ensuring a smooth implementation and minimum down time.

Support staff must also be effective communicators, explaining to users how technical problems may be resolved and possibly avoided in the future. Dalziel and Schoonover (1988) indicated that "competent experts present complex ideas in terms related to end users' concerns. They not only make sure that language is tailored to the audience, but also take into account how the audience learns or absorbs concepts" (p. 91). The need to convey concepts in terms that are easily understood and assimilated by end users is as important to those implementing change as it is to those whose job is to support the change.

The Information Centre: A Flexible Alternative

A strong commitment to change is not enough. Fullan, (1982) commented that "commitment to what should be changed often varies with knowledge about how to work through a process of change" (p. 82). This is often true for highly technical computer innovations where the technical know how exists along with the commitment to put it in place but the knowledge of how to effectively implement the change is lacking. There is a need for up-to-date management approaches that will permit data processing departments to

deal effectively with ongoing change. These approaches require a structure which is flexible enough to adapt to changing realities.

One such structure is the information centre, which provides the kind of flexibility required for dealing with a rapidly changing technology and the growing needs of its users. The information centre is a concept that has developed largely to provide technical support and services to staff and management with respect to computer use. The information centre is designed to "encourage, train, and support end users who use computers directly, generate reports or create applications" (Martin, 1984, p. 101). This centre is generally comprised of a group within the data processing part of the organization, although all members need not have a data processing background, and is designed to serve the end users directly and speedily. The overriding objective is to bypass the slow conventional approaches to development techniques generally required in software development and, in cooperation with end users, speed up the creation of desired applications. The information centre is also an effective change agent promoting, guiding, and assisting users to adjust to all aspects of computer change. The group is knowledgeable in the use of the existing hardware and software and possesses exceptional communications skills.

It should be noted that it is not so much the structural form which provides the unique benefits of the information centre but the manner in which those who staff it go about meeting the needs of end users. The concept of an information centre is very much a result of a rethinking of the raison d'être of the data processing departments and a focus on providing for the needs of end users. The centres contain both consultants and technical specialists that cater to the needs of end users.

The major benefits of the flexible structure of the information centre are:

1. Users are not only trained in hardware and software use but, in cooperation with specially trained staff, they determine how to apply the appropriate tools to solve their problems.

2. Training is generally not a one shot effort but rather is part of an ongoing process which shadows the changing technology. In traditional data processing departments, training end users is generally not part of their mandate. This task is usually left to the software vendor or some third party, who unlike the information centre staff, generally have not established an effective working relationship with end users and lack an intimate knowledge of their needs.

3. Since trained software specialists are part of the information centre team, help is readily available when problems occur.

4. Information centres are designed to be proactive rather than reactive and, as a result, spend considerable time on research and development. They also consider how the use of new tools might benefit the organization (Oglesby, 1987).

5. Because of the close association between end users and the information centre, a trust and confidence is developed which enables the staff to deal more effectively with user problems.

6. Users are included in the development of software applications and are involved in prototyping and testing products. User involvement is important in developing systems in which users will have confidence and be able to operate successfully. It promotes a feeling of ownership among users and results in a stronger commitment to making the proposed change work (Mankin et al. 1988).

As a result of these and other benefits, the information centre can be an extremely flexible structure within the data processing department and because of its design and makeup can readily adapt to a rapidly changing technology and changing user needs. It is possible that this concept may contribute significantly to the needs of educational office computer users and help school administrators in achieving the maximum use and potential from their systems. In addition, it may help solve some of the current problems encountered by school office staff with regard to implementation of personal computer systems and the process of change encountered in this regard.

Chapter 3

Methodology

Introduction

This chapter discusses the methodology used to conduct the study. The chapter is divided into five sections, beginning with a discussion of the research design and is followed by a rationale for the method of selecting the study sample. A description of the data collection process is then presented and followed by a description of the data analysis procedures. The chapter concludes with a description of the procedures used to ensure the trustworthiness of the data.

Research Design

The study can best be described as descriptive in nature in that it is designed to describe how the school boards in this study are approaching the computerization of school offices, to identify what is currently in place with respect to training and support services, and to understand and relate the participants' experience and reflections regarding these areas. The study utilizes qualitative methods with interviews specifically being used in order to enable the researcher to probe for a deeper and more comprehensive understanding of the perceptions and experiences of participants. The study was designed to seek out the perceptions of participants with respect to training and support practices and obtain personal reflections and insights into the process of technological change and the participants' part in it.

Sample selection

The population was limited to those school jurisdictions with a central office within a two hour driving distance of Edmonton. Purposive sampling was used in order to ensure that each of the jurisdictions selected possessed a mainframe computer, a centralized data processing department, and were involved in the computerization of their school offices. Three jurisdictions were selected and permission in writing was sought to conduct the study through use of the Cooperative Activities Program: Research Application Form.

All prospective participants in the study were contacted by telephone and asked if they would be willing to become a part of the study. For the actual study 18 interviews were conducted with a total of five coming from each of the selected jurisdictions.

Six interviews were held at the central office level. These interviews were held with participants from the central office who were knowledgeable about the process of school office computerization and the computer support services provided by the jurisdiction. Three primary interviews were conducted with three additional interviews done in order to provide a more complete background of the structure and practice within the jurisdiction. Participants at the central office level were chosen because of their knowledge of the overall goals of each jurisdiction with respect to computerization, their role in the implementation of office computer systems, and their involvement in the ongoing support provided for school-based users. In addition, these individuals were chosen because of their knowledge of the degree of computerization of the schools within their jurisdiction.

Within each jurisdiction two secondary schools were randomly selected from a list of schools having implemented office computer technology. This ensured that a school was selected that indeed had a personal computer system installed. It also ensured that the staff had a knowledge of the system in use and that they were able to discuss their own system and the support services at their disposal. One junior high and one senior high school, were selected from each jurisdiction which could provide the researcher with the type of information he was seeking. A total of two schools were selected within each of the three jurisdictions and interviews were arranged with one administrator and one secretary from each school. From within each school, the administrator and secretary who regularly use the computer or data from it as part of their job were contacted. Their verbal permission was obtained prior to their being interviewed. Secondary school administrators and secretaries were chosen as participants because of the researcher's understanding and familiarity with that setting and the fact that in most systems this level is very often the first to be able to afford and implement such new technology.

Data Collection

Three jurisdictions were selected and data for the study were collected through semi-structured interviews of central office and school-based personnel. The interviews were taped and verbal permission was sought prior to the interview taking place. Prior to the commencement of the interview, the participants were advised that their participation was voluntary, that they may decline to answer any question and, if they so desired, call off the interview at any time.

The instruments used for the interviews were developed by the researcher and the questions formulated reflected the researcher's personal experience in the field and the literature review. Three interview guides were prepared and pilot tested: one for use with computer support services personnel, one for the school administrator most involved with the computer, and the other with school support staff, which in this study was usually a secretary. In addition, the interview guides were given to a colleague to test for question clarity and to ensure they adequately covered the research field.

Feedback from the pilot testing of the interview guides served as a basis upon which to clarify and revise questions in the guides. Pilot testing enabled the researcher to test his own interviewing skills and focus more clearly on the the experience of participants. By pilot testing, the researcher was also able to gain a greater sensitivity toward certain issues related to the process of change.

Data Analysis Procedures

The analysis of the data was ongoing from the moment of initial contact with each of the participants. Data files were maintained on each of the participants consisting of journal entries, notations, and transcripts. The focus of the analysis concentrated on data obtained regarding the three major aspects of computerization which were identified previously: training, support services, and change.

The participants' interviews were transcribed and printed copies were color coded to identify interview participants from each of the jurisdictions. Following transcription, a

computer was used to aid in the coding and categorization process. The categories were grouped under the three areas of focus used in the interviews: training, support services, and change.

The use of Fact Finder, a computer software application for sorting information, provided the researcher with an audit trail and assisted in the efficient organization of the data. Once the content was categorized using the research questions as a guide, the data were analyzed again in order to identify the emerging themes.

Trustworthiness

Before each interview the researcher clearly explained the background and purpose behind the interview thus helping to ensure that the participant had a clear understanding of the nature of the research. During the interview, the researcher attempted to make sure that the respondent clearly understood each question. The researcher also probed for a deeper understanding of the respondent's answer.

Triangulation was used were possible to corroborate the findings among school-based personnel within each school and school system. Information provided by the principals was cross checked with the information provided by the school secretaries and corroboration of information, particularly as it related to each of the school systems, was sought from same system participants. In order to clarify comments that were unclear, some participants were contacted by telephone.

As mentioned in a previous section, purposive sampling was used in order to select the sites and participants on the basis of the information they could provide. This strategy helps improve the trustworthiness of the data that were collected because only knowledgeable and well-informed participants were selected.

Chapter 4

Jurisdiction X

Introduction

Data for this study were collected from three school jurisdictions from January 1989 through May 1989. In order to adequately present the findings, each jurisdiction will be presented separately but with a parallel structure. Following the presentation of findings from all jurisdictions, a summary and synthesis of major issues arising from the analysis of the jurisdictions will be presented. Recommendations dealing with these issues will then be made, followed by suggestions for further study. Throughout the presentation of the findings, quotations from interview participants were corrected grammatically but with the preservation of their intended meaning. The three jurisdictions will be identified only as jurisdictions X, Y, and Z. In addition, pseudonyms were used for departments within jurisdiction to protect the confidentiality of sources.

Background

The selected participants in jurisdiction X in the junior high school setting were from a school with a student population of approximately 500 to 600 and a teaching staff of between 30 and 40. The senior high school participants were from a school with a student population of approximately 1300 to 1400 and a teaching staff of between 90 and 100.

In jurisdiction X, all schools are connected through the telephone lines to a centrally located mainframe for the purpose of maintaining student records information. Many schools have dedicated phone lines but there are still some which do not have this luxury. In order to access this centrally located computer, all schools are using IBM or Macintosh personal computers equipped with communications devices. These personal computers act as intelligent work stations which allows school-based users to maintain student records information. The larger high schools, in addition to having intelligent work stations, are also equipped with terminals dedicated to the student records system. In addition to pupil records management, schools are using the IBM or Macintosh personal computers for

word processing, bookkeeping, school budget preparation, and electronic mail. They are experimenting with other computer software programs such as desktop publishing, accounting packages, and data bases for inventory purposes. All costs involved in supplying the school offices with hardware, software, and training are covered by the school board. The present pupil records system was developed by the jurisdiction and its use is presently mandated by the central office. Since the school board provides the school office software, system-wide software is standardized and upgrades are controlled by the central office. Personnel from the department in charge of administrative computing have indicated that "training is far more expensive than software will ever be" and as a result of this belief, they have endeavored to select software which is virtually keystroke compatible in either the IBM or Macintosh PC environments. System-wide standards are also applied in the selection of hardware; and, as school office users become more sophisticated users, they progressively become more involved in selection decisions.

School administrators and support personnel interviewed for this study were involved with the use of computers in some aspect of their job. None of the interviewees had computer training before entering their present position. One school-based administrator used the computer directly, while the other person indirectly accessed information stored in the computer through the school secretary. All secretaries interviewed for the study were the main operators of their school's computer system.

Support Services

Existing support structure and practice. The support services provided for school-based computer users embraces a wide range of services which fall under the responsibility of four different departments: Instructional Support Services, Planning and Development, Data Information Systems, and the Educational Resource Services. When asked to describe the kinds of support services that were provided for school-based users, one central office

administrator stated:

> When a user says, "Help! My printer won't print. How do I download that and make it print on my printer? My system is hung! I can't change the screen. or, I can't change the name.", those kind of generic questions are dealt with in two ways. If they appear to be hardware related, the technician in Educational Resource Services who looks after all the instructional computers will also look after the office-based personal computers. If the problems are communications related, either modem or direct line, then one of the programming staff will go and resolve those communications problems.

In addition, it was further indicated that Data Information Systems look after the mainframe and any problems that school-based users have with the student information system. Support for all office programs including the student information system may also be obtained through various central office "lighthouse" users. These users, while not necessarily having any technical training, are knowledgeable and skilled in the use of the various software programs used in the school offices. These individuals are found in Planning and Development and in Instructional Support Services. Although plans were made for some support personnel to visit schools on regular basis, this had not materialized. When asked if schools were visited on a regular basis, one central office administrator indicated:

> Not as regularly as they are supposed to be visited. We do have a visitation program where either I or my secretary will visit every school. The idea was once every three months, and because of work pressures, that has not been happening. But it was certainly intended that every school be visited.

The purpose of the intended visitation program was to be diagnostic in nature and to provide feedback to the central office personnel. One central office administrator stated:

> Basically, like the doctor, it was a check-up. "Are you using it? Is it working well? What kinds of things are you using it for? Are you having problems? What kinds of problems are you having?" By doing those kinds of things systematically, I get a pulse rate back. I want an evaluation. Is that working well or is that not working well?

At present support services personnel visit schools only in response to hardware or software problems encountered by the school-based users. Some additional support is also

provided by external sources such as the telephone company which responds when technical problems arise associated with telephone links.

School experience with support services. When asked if school personnel would know exactly whom to telephone if they were having hardware or software problems, one central office administrator indicated:

> I would suspect yes. If it's hardware related, Educational Resource Services has a long history of those kinds of things. Any other question first comes to my secretary who tries to determine what it might be and will refer it to myself. Because of the time-lines involved in phase two of the pupil records system, we've prevented schools from getting directly at the programmers until September. They don't even know the telephone number. They communicate either electronically, "Help! I have a problem." or they contact my secretary who will forward the request.

While no formal trouble line exists, the secretary from Planning and Development has informally assumed that responsibility. One central office administrator has done most of the training for the office software. This administrator has become a major source of support for many school users. One central office administrator commented, "Because this individual taught them, there is a bonding that takes place and that becomes the first line of call."

When one school administrator was asked if the mandate of the central office support personnel was clearly established, he indicated:

> Not all of the services that you have a need for have been assigned to someone and there are things that you have become aware of over time. For instance, a certain individual has an area of expertise although they are not specifically assigned to be responsible for that area.

When one school administrator was asked if there was a directory which spelled out whom to telephone for what service, he said "no" but later indicated:

> There is no one specific directory that spells all of them out, but there are different documents related to different portions and they do indicate who to call with regard to this particular type of problem. It is not all together in one particular document but it is available in various documents.

Those interviewed appeared to use the same one or two central office contacts all the time whenever they encountered a problem. Both school administrators and secretaries indicated they have come to know and use specific central office computer support personnel through work situations, inservices, or the grapevine. When asked where they turned when they encountered computer problems, one administrator indicated, "There are two individuals there, one in terms of programming and how to and then the repair department which has always been there." When asked the same question a secretary replied, "I turn to the person who installed it." As a result, there is potential for service response to be delayed because of two or three well known staff having to deal with the bulk of user problems and the overworking of some personnel for whom particular types of service may not really be their mandate. The lack of a formal support hot line through which all calls for assistance can be channeled prevents both the monitoring of user service needs and the directing of calls to those who have the mandate and the expertise to provide the service.

When school-based users were asked if they ever encountered a problem with the level of the language used by technical support staff, one school administrator said "no." Another administrator indicated:

> It really depended on the individual, the individual background of the person you spoke to or requested assistance from. If that person had worked in an office and in a school setting, then the response that you got generally made a lot more sense and was a lot easier to translate and was a lot easier to work with. If the individual was university trained in theory and programming, the best that you could hope for was that the problem would be solved and you would have half an idea of what went wrong. Every individual that we worked with did in their own way try to do the best they could, but someone with experience working in a school office or working in a school classroom and understanding the educational jargon and educational needs was a lot different and a lot easier to work with. It has been all right for myself. The secretarial staff have often complained that it is too technical for them, would I please just show them.

When asked about the promptness of the service provided, both school administrators reported having no problems. One administrator was particularly supportive and

understanding and indicated that support was:

> Prompt in the sense that they did the best they could with the time that they had available. The department that has been trying to assist us has been really restricted financially, both in terms of their staff and their funding. They have done the best they could with what they had available. If they had difficulty responding in a hurry to a concern, it is simply through sheer overload and lack of funding.

When asked if central office support personnel were friendly to deal with and sympathetic towards the problems faced by school users, all administrators in this study indicated that they were but one added, "The only people that are not sympathetic are the people in the next step up who want the information, and want it now."

One secretary commented on her experience with the level of language used by central office support staff by saying, "When I call over they realize that I'm not a computer whiz because I say the little red button is not flashing. They know that I am down here at ground level... I'm very persistent and say I'm sorry, I don't understand what you are saying so they will bring themselves down." Another secretary commenting on the technical level of the language use by one support person she had occasion to call said, "No, he speaks your language."

All school-based users indicated that they felt the technical support staff were friendly, courteous, and sympathetic to their problems. One secretary commented:

> They understand there are a lot of things that were new to us. You never feel like you have made a mistake, they never say a harsh word to you or make you feel like you have done something stupid. They never talk down to you. They are very good.

On the whole most school-based users felt very positive towards the support services provided by the central office support staff. One secretary summed up her experience with central office computer support staff by saying, "I just find that they are excellent over there."

Informal support. In addition to formal support structures, the informal support that school secretaries and administrators provide for their colleagues is an important part of the support network. The central office personnel encourages secretaries to contact other

secretaries who might provide assistance. As one central office administrator noted, "This has worked well in word processing." One central office administrator likened this unto a "peer support program." Schools which were involved early in the computerization process and have a knowledgeable secretarial or administrative staff have been sought out by those looking for assistance and have played a useful part in the support network. One school administrator discussing his school's role in the provision of informal support stated:

> We have been in a position to provide that for other schools. We are one of the first schools to become involved in it, so we are basically being used for informal support for the other schools that are becoming involved. The secretary that does the majority of the work for me spends a good part of her time providing support for other secretaries who recently became involved and are being trained in it.

In addition to support from other schools, some schools also reported being able to utilize the expertise of knowledgeable staff members from within their own schools in solving many of their computer problems. One school administrator indicated that:

> We do rely a lot on the expertise in our particular school because we are fortunate to have a number of people on staff who have computer training and experience and are involved in a lot of software packages and different types of equipment. We have often been able to solve some of our little "glitches" ourselves. When we cannot resolve these within our own resources, then we call the people that are set aside to do that.

Commenting on assistance provided by other schools, one secretary indicated, "I'll call another school and say 'Is your machine down?' or ask 'What have you done when this has happened?'" One school secretary utilized a knowledgeable administrator as an initial source of help before calling for central office assistance. This informal support network, no doubt, saves central office from dealing with a considerable number of user difficulties and at the same time promotes understanding and confidence in users who can quickly and successfully diagnose and solve minor problems. While informal sharing over the telephone and with other staff members on-site has been valuable, all secretaries expressed a desire to get together to share and discuss mutual difficulties and concerns arising from their computer work. One secretary stated, "I really need to get together with other

schools, attend workshops, and share." Commenting on the lack of time and opportunity to share, one secretary indicated:

> You do not have time. You just do not have time. At secretaries' conferences, we have tried to get them just to have an afternoon of sharing, and they seem to think that you have to have speakers. Just give us a few minutes. Give us some time to talk.

Another secretary commented on the need for more of this type of interaction between her colleagues by stating, "I would like to see more communication between secretaries.... I am sure that there are lots of things that we could be sharing and doing probably simpler than we are now."

In addition to assistance provided by telephoning colleagues directly, users of the pupil records system have regular user meetings where a sharing of what users are doing is a regular part of the agenda. This meeting is an attempt to disseminate information and provide user support. Information provided by school staff members indicates that representatives at this meeting are usually not the primary operators, but rather are school administrators. In an effort to foster and encourage sharing among schools, one central office administrator indicated that:

> Next year we are looking at some program where the pupil records people will actually visit and spend a half a day at somebody else's school so they can watch the kinds of things they are doing. They can look at how the school is organized and try to, by observation, pick up ideas, because not everything comes forward in the meeting.

Again, this unfortunately may not include the actual secretaries responsible for the schools' computer operations.

Manuals are often another source of assistance for users but as one school administrator put it, "When you are computer illiterate, you don't have time to flip through manuals and guess. When you're running discs with all the student files on it and it just collapses, you pick up the telephone. You don't go to the manuals." In talking about the use of manuals as a source of help, a secretary with no computer background indicated, "I find that it is such a waste of time trying to figure it out myself. It's just much faster to

telephone. One secretary complained about the way revisions were handled in the jurisdiction's student information systems manual indicating that:

> When they make revisions, instead of noting in the column where the errors are, so you could read just that particular portion, they just send you the whole sheet, so, I mean we could have been reading for days.

One school reported making up their own manual containing short cuts and explanations of problems that had been clarified or procedures not covered in an existing manual. Manuals appear to be most useful to those persons who possess some knowledge of the computer and its operations. Persons who have minimal computer literacy appear to depend more upon formal support structures.

Strengths and weaknesses. In commenting on the strengths of the computer support services, one senior central office administrator indicated that support service personnel had "tremendous talent, good experience, had a good outlook and were computing professionals." In addition, he applauded the technical ability of the central office programming staff, specifically referring to their recent achievement of successfully designing, developing, and implementing a flexible student information system that in the future could easily be ported to personal computers to allow for distributed processing.
A school administrator identified one strength as "the particular team of people that we have." In addition, he indicated that the central office support personnel "are excellent to work with and they have been as responsive, sensitive, and cooperative as they possibly could be to the schools given the restrictions they are placed in." A secretary commented favorably on their knowledge and indicated "they come whenever you want them."

Identifying weaknesses was somewhat more difficult. At present, there is a potential for conflict between the instructional and administrative areas of computing, due to advancement by both groups into areas of mutual concern. In addition, there is considerable overlap in service provided by each of the different departments. It is hoped that present restructuring will clarify responsibilities in some of these areas. An example of

conflicting interests was indicated by one central office administrator who commented on the selection by Instructional Support Services of a system-wide student marks software package for teacher use. This selection may potentially conflict with future aims and goals of the departments Planning and Development and Data Information Systems to provide for an on-line student mark application. In addition, there was some degree of overlap in service provided by three departments. School-based computer users have indicated that personnel from Planning and Development, Data Information Systems, and Instructional Support Services all provide assistance to users in the operation of the student information system. In addition, personnel in Planning and Development and Instructional Support Services both provide assistance to users on other system-wide administrative software. Commenting on this weakness, one central office administrator noted:

> A weakness I see is that we still are three different departments. We're instructional support services, we're planning and development and we're data information systems and I think it would be far better off to merge those things together in one area so as we get into the new technologies instructionally, we can do so administratively as well.

Difficulties were also noted by central office staff members who indicated that at times they were instructed to do something by someone who was not their administrator and which was not a part of their mandate, thus placing them in awkward situations. Users also seem unclear regarding the assigned mandates of support personnel in the central office. This is evidenced by school personnel seeking assistance from individuals who, while qualified to give assistance, did not formally have that mandate.

Change

Central office support for change. All participants from this jurisdiction indicate that central office is very supportive of the new technology. One administrator, when asked if central office showed strong support, indicated:

> The fact that every senior administrator is now using [electronic] mail, the fact that the superintendent has a personal computer on his desk, that he served notice to the general principals' meeting that principals are going to have to learn these things,

> and the fact that it has been supported in the budget process even in hard times--yes, you can't get much more commitment than that.

When asked if adequate resources with respect to staff, training, and financial support were provided to successfully implement change, one central office administrator said, "Yes, I would say so." At the same time it was recognized that the present situation was not ideal; a central office administrator indicated that:

> If it was ideal, I would like to see a computer on the administrator's desk networked to the secretary so that there is file sharing there. If there is a second secretary in the office, she needs a machine. You cannot share one machine.

School administrators indicate that while central office has shown very strong support for the computerization of school offices, there has been a lack of resources to fully implement the change. When school personnel considered the resources provided to the schools to support computerization, they generally have indicated a lack of funding for computer equipment. One school administrator stated that "I believe the training and the support level have improved greatly in the last year or two, but the resources [computer equipment in the office] are still in short supply due to a lack of funding." One administrator commented:

> I think the most important thing would be the funding, and I believe that without a radical improvement in the dollars available to equip the schools and to provide for the support staff and the training and release time for the people being trained, we will still progress but it will not be anywhere near our potential.

School administrators and support staff are in agreement that one personal computer is inadequate to serve their school's present needs. Some high schools have not had this problem to the same degree as they have been able to borrow hardware from their computer laboratories. Complaints regarding a lack of equipment were raised, particularly by personnel in the junior high schools. One administrator stated, "Our office is supposed to be totally computerized, on one machine -- it is ridiculous." Another likened having one computer to "having three secretaries and one typewriter." This administrator further stated:

> Ideally I would like to see each of the secretaries that is involved in working with the computer programs have a stand alone computer that also has communication

> capabilities with the mainframe to operate those programs. I believe that if administrators are to be using the electronic communication in keeping up with the computer changes, there should be a terminal available for administrative use, either one in each office or one in an office where an administrator can go and use it.

Secretaries also noted the difficulties they experienced as a result of trying to juggle three or four people on one machine. One secretary commented:

> I think they should come and see the situation that we are handling here. I know at the central office almost everyone has their own computer and they gave us one computer. They want us to use Excel but I think they have to realize that if they want this, they are going to have to supply us with the resources.

The dissatisfaction appears to be not with the capabilities of computers but rather points to problems which begin when more than one person wants access to one computer. These problems are compounded when both the school and central office realize the potential of personal computers and want to maximize their use.

Communicating the reasons for Change. When asked if the reasons, objectives, and benefits of a change in computer equipment or software were clearly explained to those who would be required to use it, conflicting opinions were obtained. One central office consultant said "no" and stated that "computerization is a fact of life," while another indicated that this was a key issue and implied it was important in obtaining user support. In discussions held with central office administration, one individual indicated that "I don't think the secretaries are aware of the big plan." This seems to be substantiated by the secretaries' comments. While school administrators felt that the reasons, objectives, and benefits of a change were adequately explained and were satisfied with the degree of communication received, secretaries did not feel this way. One secretary responded, "No, they don't communicate with us in that respect at all." and another said that "my feeling is that all this was implemented for the sake of central office." Supporting a need for better communication, one secretary indicated that a lot of people think, "Why are we doing this? What is wrong with my way of doing it? Why change it?"

School input into the process of change. Early in the computerization process, there appears to have been ample participation by central office and school-based

administration. When asked who was responsible for designing the new computer applications for school offices, one central office consultant indicated that "a lot of people have input." Using the example of the initial planning of the student information system, it was noted that the steering committee was made up of principals and representatives from central office. One central office administrator indicated:

> Definitely there was a plan for the student information system. We are into phase two of it right now. There are four phases that have already been planned out and I know there has been a lot of input from principals and central office.

While input was obtained from school administrators and the central office personnel, those whose jobs would be most affected by the changes and would be the primary operators of the proposed system appear not to have had formal standing on the steering committee.

With regard to the initial selection of hardware and software, schools appear to have had no input. Those in charge of administrative computing agree with this observation and indicate that this has and is changing. A central office administrator stated:

> Hardware requests now come from the schools. When we first began computerizing the schools, we said, "Here is what we are giving you." Now we have a folder full of requests from principals indicating, "Here is what I want, here is why I want it, and here is how I am going to use this in my school."

A similar change is happening with regard to selection of software. Initially, the standardized system-wide word processing and spreadsheet software was selected solely by individuals in central office who had knowledge of software that was available. They made a decision based on their perception and judgement as to whether a particular application would meet the needs of the school system. As computer knowledge increases among school-based users, the selection process appears to be taking on a more cooperative approach, involving the direct input of school office users. When asked if schools were involved in software development, selection and modification, a central office administrator indicated that "they haven't been, but will be because they all have something [a computer system] and their knowledge level is increasing." When asked whose

responsibility it was to make decisions regarding which new applications should be implemented, he continued by stating:

> That is in transition. Originally which word processor, which spreadsheet--those decisions were made quite early, so that we did not have fragmentation. When it comes time though to look at a personal computer-based accounting package, then very clearly we will have a more formal steering committee. We will have some of the business managers from the bigger schools, and the bookkeepers from the smaller schools involved in that selection and testing.

The above process appears to allow for the input and the involvement of school personnel in the direction of change and gives them status and influence in decision making.

School administrators have also had input into the ongoing development of the student information system. Recently, an administrator has been involved in the prototyping of programs being developed by the jurisdiction and thus has had a fundamental impact on the program's design. A senior central office administrator described this individual's involvement in the prototyping process as follows:

> I guess the most recent way is a secondment of a school administrator to work in the same room with the programmers and represent the interest of the schools. So as the product is being developed he can say, "Here is what we really do" and the programmers write the program and bring it back and he can say, "No, this is not right. You missed what I was saying." We have put them all in a separate room, isolated primarily so that we have very short decision cycles. That person then is also the primary one we use with the schools themselves, so as new programs get done, selected people from junior and senior high schools will be brought in and we will say, "Here is what it is going to look like, here it is now with your data, try it out."

School administrators have also been involved in pilot projects related to the development of the jurisdiction's student information system. One administrator involved in a pilot project commented on the degree of input by indicating:

> We have been encouraged to suggest developments and improvements all along. We have been developing a system from scratch and we are still building the basics of a good student data system. Because we are trying to build our own, there has been a lot of encouragement and a lot of involvement in development and in planning.

The lack of initial involvement by school administrators in the selection of hardware and software was likely due to the fact that most school administrators had little experience

or knowledge of computers and software applications. This is substantiated, in part, by earlier comments made by central office personnel. As one administrator commented when asked if his school administration was involved in the selection of his school's computer system, "No, we weren't, but this was not an issue because we weren't literate enough to know." When asked if he felt they were literate enough now, he said, "Yes, and I think that if they [central office] were going to finance us to expand, then we would have our input and they would allow it."

To date, school support staff who will be the ones most affected by the changes in computer technology and software appear to feel they have had little input into the change process and have not been formally acknowledged as participants in decisions which affect how they perform their jobs. When a support staff member was asked if she had any input into proposed changes, the answer was "no, not from me. They never include us in any of their meetings or anything like that. They never ask the secretaries." While school support staff appear not to have had formal input into decisions affecting their jobs, they have had informal input. Central office personnel have actively gathered input through user complaints, casual interaction with users during school visits, and through input from school administrators. On at least one occasion, secretaries have had input into program development, but appear unsure of whether their input was of any value and whether their suggestions were acted upon. One support staff member indicated, "Some people did say they didn't like certain things, but whether they actually changed anything [based upon] what the secretary said, I don't really know. I don't think that we as secretaries have very much input." In reality, although it was a training session, secretaries did have input and as they made suggestions the programmers incorporated them into the program.

In addition to involvement in system-wide initiatives, the district's schools have also been encouraged to utilize software applications at their disposal to solve problems unique to their own setting. When a school does not have the necessary applications software, central office has a small amount of money set aside to sponsor local initiatives.

A central office administrator commented on this practice by saying, "We want people to explore and learn and broaden their horizons, and if they think it is important, we want to support that. So, we've actually funded some local initiatives."

Increasing expectations. Some concern has been raised regarding the increased demands placed on secretaries as a result of computerization. A central office administrator expressed concern about the increased demands on the secretaries saying, "Maybe there are things we are doing that we don't need to be doing any more. It is like curriculum. We keep adding on but we never take anything away." Because of the computer, school office jobs have changed and the expectations for service by others have grown tremendously. As one central office administrator notes, secretaries say, "It does not save time. I have more work now than ever and the expectations by everybody else have become greater." There is a feeling that those involved in the implementation of computers appear to lack understanding of the reality of the pressures placed on school office employees. One secretary stated, "I think they have lost touch as to the demands on the support staff in the school situation." Evidence to support this lack of awareness comes from the comments of one secretary who indicated, "There are no job descriptions for a lot of these positions." She further indicated that in preparation for an evaluation of her job performance, she was asked to write down her job description. Commenting on the overload, one secretary indicated, "Last weekend I took home 12 hours of work. I should not have to do that."

Attitudes towards computerization. It was indicated that most school support personnel have accepted the introduction of the computer into the school office but that a few persons have resisted becoming involved with using computers. One central office administrator noted that some secretaries would rather "do some other job" than be forced to learn how to use the computer. Resistance to becoming involved with using computers is found in the ranks of school administrators as well. Some school administrators seem to behave as if the computer is a passing fad or something they will somehow be able to

avoid. This attitude is supported by the comments of one central office administrator who indicated:

> You can help, persuade, and whatever and there are still people, administrators and teachers as well, who really believe this media is going to disappear or they are going to retire before they are going to have to use it.

Recently there appears to have been a gradual change in the attitudes of many school personnel. One central office administrator indicates:

> I think initially when computers were introduced, administrators were saying, "I do not want to worry about this." I think now they see this is definitely going to be on their desk or in their school and a lot more are now wanting to know more about it, how it works, and how to use it.

In addition, the same administrator noted that "you are hearing more administrative staff saying they want a computer on their desks. They want [access to training] courses such as keyboarding, introduction to computers, and word processing.... A lot of administrators are starting to move."

Attitudes towards computerization have varied among school administrators and support staff. While some have eagerly embraced the new technology with open arms, others have grudgingly accepted computer use as inevitable. Others, though a small minority, have vowed they will not use computers. One school administrator, echoing comments by central office personnel, indicated, "I know that in some of the schools in our jurisdiction, secretarial staff have retired early or gone on to other lines of work because they were unwilling to become involved in learning to use computers." A school administrator indicated that one of the major obstacles involved in the change to computers was "working with the attitudes of people and getting them to accept change." In particular, one administrator noted that "within the school setting, there is the attitude 'I have always done it this way'." He further indicated that "people are willing to accept change if the change [accomplished] is in the way they are used to doing it." For a few, strong support by the school district central office in mandating computer use seems to have been required in order to force them into using the system. One school administrator

notes, "I feel that there are elements in our jurisdiction that would not have become involved if they were not forced to become involved."

Many reasons were suggested as to why some school personnel have not wanted to use computers. Some have indicated fear of the computers, bad past experience by others on staff, reluctance to change existing practice, lack of knowledge, perceived inadequate levels of support, and the belief that as boss the skill is not needed because "I have people out there that can do that for me." While, no doubt, many other reasons exist, these are some of the ones that were suggested. While there is no doubt that the poor introduction of the student information system, coupled with extenuating circumstances in some schools, has contributed to a degree of pessimism on the part of some school personnel, a growing number of school staff appear to be gradually embracing the use of computers. One school administrator indicated that "six months ago I sensed all sorts of hostility. I sensed fear about the whole process, reluctance to use it because it was not a time saver. It was taking tons of secretarial time to input all this information that had to be entered. I think that has now changed a lot."

Training

Jurisdictional approach to computer training. Training is provided for two different areas of school office computing. First, training is provided for staff who operate the school jurisdiction's student information system. This information system requires confidentiality on the part of the user, the use of passwords, and communications equipment in order to access the school jurisdiction's mainframe computer. Persons being trained on this system are usually provided with release time. One central office administrator commented, "Because of the confidentiality [of the information] and the nature of information they are dealing with, you cannot offer a general program to have people trained in this beforehand." Initial training for users of the student information system occurred over a three day period and was staggered so that training was not

conducted on consecutive days. Training for new personnel on this system has not been as lengthy, nor as comprehensive as it was during the initial start up period.

The second type of training regarding the information system is related to instruction received on school jurisdiction approved software applications such as word processing programs and spreadsheets. This type of training may be offered to the public at large and not just to school office employees and administrators. This latter type of training is offered by the school jurisdiction either through a "pull out" of staff during the day to a training site or through Continuing Education in the evenings at local high schools. Courses offered through Continuing Education usually are divided into three levels: beginners, intermediate, and advanced. Training offered through pull outs during the day has been two to three days in length depending on the package. One central office administrator commenting on training stated, "Most of our training is done through Continuing Education and we make use of the Continuing Education computer labs. We have tended to try to find excellent instructors and build around their times." Those involved in the planning of training appear to recognize the importance of ensuring staff have a good training experience. One central office administrator commented:

> We are really careful with our instructors, because if you get a group of people from a school and they have a bad first experience on that, the negative inertia will be incredibly difficult to overcome so the choice of the instructor is really crucial.

In either training situation, school employees who require computer skills in their job have their training subsidized by the school board. Training has usually been in groups of up to twenty people with one instructor and an assistant. On occasion when required, "one-on-one" training has been provided but this type of training has generally been related to the student information system and usually occurs only when a new employee is hired or an administrator has requested inservicing. The training material has been prepared by the jurisdiction and thus is able to cater to the specific needs of board employees. As one central office administrator involved in training mentioned, "I have an advantage in that I

have worked in this system in these schools. I know what is being expected of them and so when we build a training session it can be practical." In addition to traditional approaches to training, one central office administrator indicated that they were "putting some video segments together coupled with some Course of Action [computer assisted instruction] segments and handout materials." Commenting on these sessions, a central office administrator indicated:

> We are going to try some unique ideas with a video camera, HyperCard, and the interaction you can get with Course of Action. We can make some units so that when a new secretary comes on stream they can take this, or someone in class who didn't quite get it can take it back with them and replay it over and over again, when they have the time.

In addition, he further indicated that "we want to set up a training environment where they can come and on a self-paced basis take a lot of the introductory material."

Presently there is no formal follow-up provided for training on the student information system to ensure that it was effective and was being put to use in the schools. One central office administrator indicated, "We cannot do any kind of evaluation because that clearly resides with the principal. If the principal is computer illiterate or does not know what these things are, then he or she is not likely to follow them up." Training programs held in conjunction with Continuing Education are evaluated by the participants following the final training session and participants are given certificates if they pass the course but no formal follow-up is in place to determine the effectiveness of the training. Commenting on computer training, one central office administrator said, "I would like to have what I call a computer driver's license in which you would have different classes and as you went through these different grades you would a) get paid better or b) be more marketable within the organization."

Training is an ongoing problem. As software upgrades are released, there is often a need to upgrade the training of office personnel. One central office administrator, commenting on the upgrading of software, indicated that "upgrades tend to be incremental

and normally don't require a refresher course. I would think those kind of things would be done in two hours after school in one day. They tend not to be large changes." While it is true that some upgrades do not significantly affect the operation of the software, school-based users are often hesitant to use the new version. It was noted that some schools have had the latest upgrade of a word processing program on their machines and most secretaries have not used it because they are unsure of its operation. Part of the reason for purchasing the upgrade is economics. One central office administrator noted, "We bought it at the time that upgrades came out because it is cheaper that way." When asked if the central office intended to provide upgrade training, a central office administrator indicated, "That is what the intent is. It is just a matter of time." Some school administrators have cautioned against continually introducing change and one administrator cautioned against selecting new software for "the sake of new bells and whistles." It was further stated that "if the software is doing the job and the staff are happy with it, it should not be changed and it should be standard throughout the system."

Training of school-based administration. None of the school administrators interviewed in this jurisdiction had prior computer experience. All required or in some cases still require training of one sort or another in order to effectively use the computer systems placed in their schools. Computer training for administration has come from a variety of sources, knowledgeable school secretaries and other support staff, other school administrators, formal training programs offered by the jurisdiction, and as one administrator indicated, "In the first five years that I was involved, the training that you got was the training that you gave yourself." To date, schools within this jurisdiction do not require a minimum number of computer literate administrators on staff. At present, opinions vary among the central office administration and school administrators as to whether there is a need for school administrators to have computer training. A central office administrator, when commenting on whether minimum numbers of trained

administrators should be established, indicated:

> I hope that is happening but I am not too sure. I think there should be an administrator who knows the student information system. They have been given the chance, but I do not think we are at that point yet. I think that is a point we are working towards.

Commenting on the training of school administrators, one central office administrator indicated:

> There was a lot of discussion as to whether it should be mandatory for principals to learn these things. I am from that school, but others do not think so. So it is voluntary on the principal's part; but, if it is needed we will cover their costs. That is part of the implementation plan and is included in the administration budget.

One of the arguments put forward for having trained school administrators relates to the problem schools face when their primary operator (usually a secretary) is absent or has quit her job. One central office administrator commented that "this happened in one of our elementary/junior high schools. The secretary was absent for three months and the school came to a grinding halt." Similar problems associated with the absence of the primary operator were reported by another central office administrator who indicated, "I have had principals telephone and say, 'Can you help me? My secretary is not here today and I want to get the mail off."

School administrators are divided on the issue of training. When asked if it was necessary for school administrators to have computer training, one administrator stated:

> Absolutely! It is necessary in order to understand how we can better do our job with the aid of computers. It is really important to know what the computer is useful for and what it is not useful for. It is critical that an administrator know that there are some jobs that a computer does not do very well, and it is a waste of time trying to do it that way. The only way that that understanding can be gained is with some personal experience and understanding of the various computer applications. I believe that administrators must be trained and must be involved in computers in order to make the proper use of them in their field.

In further clarifying his position, the same administrator stated, "I think it should be required that at least one member of the administrative team is trained and has the ability to operate the computer system and the applications necessary to run the school." With a

more pragmatic response, one school administrator said, "It depends on whether they are going to be using it or not.... We had a training session and I am sure it is like any kind of learning situation. Use it or lose it." The validity of this view is born out by the case of one school administrator who had received training twice but because he did not have ready access to the computer, he could not remember how to operate the computer. In addition, another administrator commented, "Our secretary sits at the computer non-stop all day long. We do not have access to it and until we have access to it, there is not much point."

One school administrator, when asked if someone else in the school could take over if the primary operator left, flatly said "no." In one school, it was acknowledged that if the secretary were absent, the school administrators could not access or send electronic mail. In addition, the secretary remarked that if "you are sick, you come in, ...because there is no one else who can do these things." When asked if it was important to have trained staff that could back up the primary operator, one school administrator had the following comment:

> Ideally, yes. Realistically, there is not enough work to have two people trained to do one job in a school, so I cannot see that happening. That is why I feel that it is particularly important that the administrators have the skills to do those things... so that if that individual were to be removed from the job scene, the school could continue to operate.

Training of school secretaries. The need to provide support staff training is acknowledged by central office administrators. One central office administrator commented on the inability to hire support staff with computer skills by saying, "You can ask for all of these skills and what happens is very few [people] will apply. So in the larger world those skills are not there." Training is not only necessary for existing staff but also for prospective employees and this jurisdiction is attempting to provide for both. One central office administrator, commenting on training courses provided by the jurisdiction, indicated, "People wanting a job go to the personnel department and say, 'What training do I need?' and they are recommending the courses [though Continuing Education]."

One of the major problems associated with training is how and when to provide it. With respect to on-site training, one central office administrator made the following comment:

> I would sooner have the secretaries come out for training. I have tried sessions where I have gone to the school and was going to show the secretary something at her desk... Forget it, because there are just too many interruptions.

While releasing staff for training results in a better training environment, secretaries must complete the work they have missed and the schools must operate without the secretaries' services during the training period. One central office administrator indicated, "It is a no win situation." This administrator also noted that pulling staff out of their jobs for training was particularly a problem for smaller schools. Commenting on the problems associated with training support staff, a school administrator said:

> I do not believe that we have been given enough time, enough secretarial time to implement and to train....When we become short of secretarial time, two things happen. The administration starts spending their time doing the things the secretary usually does and teachers stop getting the level of support from the secretaries for the work that could be done for the teachers.

One secretary indicated, "When you come back, all of yesterday's work and today's work is still sitting there."

While it may be perceived by those outside the school setting that the pulling out of staff for training should be both a minor and temporary unavoidable inconvenience occurring only during the initial introduction and implementation phase of the school's computer system, this may not be the case. The gradual introduction of additional software packages, the upgrading of existing applications, and the possibility of staff turnover all require some degree of training and draws attention to an issue which increasingly has the potential to affect school operation.

When asked to comment on their training experience, several secretaries indicated a desire to retake courses. One secretary, after having received training on a word

processing package several months ago, indicated "I wish I could go back and take another advanced course."

In the case of training on the student information system, one secretary indicated a desire to bring secretaries back together to share their experiences, ideas, and difficulties. A secretary, referring to training received on the student information system, indicated:

> The biggest problem we have is that everyone is doing something different. No one really knows the right way.... We had a one day session to get everyone going and then since then we have not had one thing.... I think now would be a good time to get everyone together and go over what we have done.

Not all support staff were entirely pleased with the pace of the various training programs. This was due in part to the background of the trainees: those with more computer experience found the pace too slow while those who lacked prior experience reported at times finding the training "confusing." One support staff member who had prior computer training commented on the frustrations experienced as a result of taking a course with trainees of vastly differing experience. She indicated, "The training dealt with the basics. We were all at various stages and that was the worst thing. There were two girls who knew nothing about computers."

Secretaries felt that the technical level of the language used by instructors was appropriate and one secretary in particular indicated that "the level of the language was excellent." They also felt adequate opportunity was provided for personal attention. One secretary indicated that "whenever anyone was having problems, the instructors really explained it well." In addition, all respondents indicated that the training was appropriately tailored to their work needs.

Summary

School-based personnel were generally satisfied with support services provided by the jurisdiction and found personnel from the various support departments to be knowledgeable, friendly, courteous and sympathetic to the problems school computer users encountered. The major issues or concerns regarding support services arise from the data

analysis and deal primarily with structure, practice, and funding rather than the interaction between support personnel and school computer users.

With respect to the area of change, a lack of communication and input was identified although in the latter case some progress was noted. Increasing expectations and demands placed on those having to implement a change was also noted and raises some concern. In addition, the attitudes of school personnel who resist change were of particular concern.

The final area of focus was on training. No one ideal approach or method of training was identified but the need for a variety and diversity of approaches was apparent. While the analysis of the data yielded ample support and evidence in favor of the training of school administrators, some difficulties which exist with respect to this practice were also identified. The major issues and concerns arising from the analysis of this jurisdiction are brought together in conjunction with those of the other jurisdictions in chapter 7.

Chapter 5

Jurisdiction Y

Background

The selected participants in jurisdiction Y in the junior high school setting were from a school with a student population of approximately 500 to 600 and a teaching staff of between 35 and 45. The senior high school participants were from a school with a student population of approximately 1000 to 1100 and a teaching staff of between 45 and 55.

Jurisdiction Y is a large urban school board with about 50 schools using office computer systems. These schools are connected via telephone lines to a central office mainframe computer. They have the ability to communicate with and transfer information to and from the central office of the school jurisdiction. The present student records system allows for what might be described as distributed processing with schools entering and processing their own data on-site utilizing the school's office computer during the day and then uploading their new or modified data to the central student records file during the evening. Changes made by schools to their existing data are transferred to the central office mainframe in order to provide central office with a record of each school's current data. A central office administrator described the process this way:

> When there is a change to a school's current data base, we keep track of that change and make it look like a transaction going to the mainframe. It is a batch process. It is not interactive but we have automated the process to the point where when a school wants to do an upload, when they leave for the night, they just type in upload and the computer takes care of everything.

School offices are using an externally developed software system for pupil records management. This package allows schools to store and process attendance data, demographic information, student marks, scheduling, and report cards. In addition, utilizing personal computers, they may use spreadsheets for financial applications and word processing software for general office communications and desktop publishing. The Office Computer Support Department, in conjunction with the schools, the Purchasing

Department and Instructional Support Services has been in the process of identifying, evaluating, and recommending software which will be supported by the jurisdiction. The Office Computer Support Department plans to recommend a data base, an integrated package, and a desktop publishing package.

Several departments are involved with the use of computers in school offices. Members of the Information Services and the Instructional Support Services departments are in contact with school office personnel regarding the school office computer use. The Information Services department through the Office Computer Support Department is responsible for providing schools with support services and training in the use of the student records program for administrative purposes. Instructional Support Services, through consultants at the Computer Centre, provide training and support in the use of office tools, such as word processing and spreadsheet applications. At present, schools have been using the IBM PC or IBM compatible family of personal computers for office administrative applications. This policy is currently under review. While IBM PC compatible computers are recommended, one central office administrator indicated that there are some schools using Macintosh computers for office computing.

Schools within this jurisdiction are decentralized with respect to school budgeting. The school administrators have considerable autonomy and have the final authority with regard to implementing office computer technology. In addition, school administrators also have total control over how the school's computer system is to be used and the extent to which various software and application programs are to be implemented. While specific hardware and software are recommended by the jurisdiction, school principals are at liberty to select the equipment and applications of their choice, but with the full knowledge that only recommended hardware and software will be supported by the board.

Support Services

Existing support structure and practice. Assistance for users of school office computers comes from various sources within the Information Services department. In

particular, the bulk of the user support comes from the Office Computer Support Department which provides support for the student records system, fields questions from users, and deals with the problems schools experience with hardware and software. This team consists of university computer science graduates or technical school computer systems graduates plus a school secretary who is familiar with the student records system. According to one central office administrator, the team members are "out in the schools eighty percent of the time" and rather than visiting schools on a regular basis, they respond only when requested. In discussing the kind of support services provided, one administrator stated, "Any problem the school is having with hardware or the student records software--we take it from there. We get to the problem and try and determine the solution." In addition, consulting services are provided for those schools who express an interest in computerizing their school office and using the student records system. One central office administrator indicated that "if a school is interested in going on the [student information] system, we consult with them explaining what it can do. We go through a needs analysis with them and determine their short-term and long-term needs."

School experience with support services. There are specific groups within the support network who are responsible for providing users with specific areas of support. Some overlap in service has been noted. For example, the administrator in charge of Office Computer Support Department, along with members of Consulting Services, have both fielded user questions about the operation of the school jurisdiction approved spreadsheet application. One school administrator indicated, "Anything related to our computers here, I call two or three people from the Office Computer Support Department." These individuals were later identified as the ones who had been involved in setting up their school office computer system initially and with whom they had worked on an ongoing basis. When school administrators were asked if a directory existed that would identify whom they should specifically call with respect to particular software or hardware problems, one answered "yes" and the other "no." In order to help school personnel who are uncertain of

whom they should call with respect to a particular problem, a central hot line service is being established. The implementation of this hot line will allow users to be directed to support personnel who are best able to deal with their problem and allow the Office Computer Support Department to monitor and record both the number of calls and the areas of need.

When asked if support services personnel were prompt, one school administrator rated their response as "excellent." This good response was attributed to what the same administrator described as a "call forwarding system" which ensured that all calls were received by support staff even if support personnel were not in their office. He also commented that "support personnel manage to contact us within a couple of hours at the most" and further indicated that "usually we have daily service, so we are not waiting for long." In responding to the same question about the degree of promptness of support service, another administrator indicated "I think they try to be. I cannot complain if it is really an emergency. It is within the day." Some frustration was noted by school administrators during certain times of the year. A school administrator illustrated the degree of frustration by indicating that:

> This fall when the people who were serving us were so busy, one other school principal telephoned our principal and said, "Maybe we should just hire somebody between us. Let's get a programmer in here, a person who is familiar with all the things we need because information support services is not providing the service or is not able to." Our feeling at that time was that was not the way to go but we could have done that. There was nothing stopping us other than money.

Problems were particularly noted during the beginning of the school year and at year end.

School administrators also noted the heavy workload of support personnel and commented on the lack of feedback they received from support personnel with regard to system repairs. One administrator commented, "There is not a whole lot of time to explain to me what went wrong. That part takes time and sometimes they are too busy to provide the documentation that they could leave with me to allow me to fix it myself next time there is a problem." Both school administrators commented on the lack of staff at central office

support services. One administrator indicated that "the support team that troubleshoot have been excellent. My only difficulty is that they keep reducing the staff in that area and you cannot add more schools and reduce support staff. It just does not work." Another administrator noted:

> Sometimes I sense a tremendous pressure on them. When you have so much to do and it is coming in from all sides, you know how clearly you think and how you are dealing with people and every now and then I see them in that position. I can sense that immediately and back off. All it tells me again is they need a little more help.

All school administrators in this study felt that support personnel were reasonably sympathetic towards the problems faced by school-based users and felt that the technical level of the language used was appropriate. In this latter regard, one administrator commented, "If I do not understand them, I just get them to explain it in another way and they do." All administrators were pleased with the quality of the support that was received but were in agreement that the Office Computer Support Department was understaffed.

When school secretaries, who are the primary operators of the computer systems, were asked if support services personnel were prompt and easily reached by telephone when they needed them, their overwhelming response was "no." One secretary indicated, "No, they are out of the office a lot, going around to the different schools and sometimes they are hard to reach." One secretary particularly sympathized with support services staff and indicated that while she felt they "tried their very best," she also believed that "they were very understaffed." Another secretary agreed with this view and indicated that she felt support services staff were spread too thin for the number of schools they are attempting to suppo.. When asked how long they would have to wait for service, one secretary responded, "One day, two days, but with the type of things I would encounter in my job, I need help immediately."

One secretary commented on the lack of communication and the fact that support personnel, following a computer service call, never indicated to her what the problem had

been. She indicated, "They usually come over and fix the computer but there is no communication.... They come in and do whatever they have to do and you never really know what went wrong." When asked if this knowledge would be useful for future reference to avoid calling support personnel and to rectify the situation herself, she responded, "Yes. Usually it is something very minor that you have done." In addition, one secretary expressed a general desire for a more in depth knowledge of the computer program with which she works and a better understanding of the personal computer and its operation.

Commenting on her experience with the level of the language used by support personnel, one secretary commented:

> When I have asked for help, they have been very good in explaining. When I did not understand because of some of the technical terms, they tried to explain it so I could understand it. I do not feel intimidated phoning them and indicating that I do not understand. They would then go back to step one and just go through it.

Secretaries, while pleased with the quality of service and the level of language used by support personnel, did not feel service was prompt enough to meet their needs and indicated that computer support personnel were sometimes difficult to reach. These problems were attributed to insufficient staff. In addition, secretaries perceived a lack of communication by support staff regarding what had gone wrong with their system and indicated a desire for information on how to fix the problem themselves should a similar minor problem occur again.

Informal support. Informal peer support is provided by school-based staff. One central office administrator, when asked if ideas were shared between schools, said "yes" and indicated that there were frequent user meetings.

When school administrators were asked if much sharing of computer knowledge occurred among schools, one administrator said, "Not really." He continued by saying that "initially when the student records system came into being, the school system did have user

meetings but I do not think there has been a meeting in the last year and a half and probably there should be."

It is worth noting that the software developer who produced the student records software used by this jurisdiction has been taking full advantage of the resource of knowledgeable school office computer users by having them share their expertise with their fellow colleagues. As a school administrator noted:

> They have done a masterful job and have figured out all kinds of ways that they can get a little bit of money. Very often, the users are the ones presenting the sessions at their national conference. It seems to me that you are paying for your own advice.

One administrator, commenting on computer support he provides for his own staff, indicated that he was "the first person that people call for assistance." He further indicated that "there are some things that I have learned and very often I will have the answer. It is not because of any particular training. I am interested in this area." In addition, a school administrator who has been using the computer for a considerable time spoke of providing assistance to a colleague outside his own school jurisdiction.

Secretaries on the whole felt that utilizing the expertise of their colleagues was useful but those secretaries in schools that were advanced in utilizing the computer system or who had knowledgeable administrators on staff felt they would be more inclined to provide the service to others than to take advantage of it. One secretary indicated that "I know that there was someone who called here asking for assistance and we were able to help them out." Another secretary indicated that her assistant principal had suggested she telephone another school secretary who could provide assistance on a new program. A secretary suggested that more interaction between schools and between their colleagues would be useful. In particular, she suggested that those involved in operating the school office computers might find it useful to visit other schools to observe what they are doing with their computer systems.

Manuals are a form of support that school administrators indicated they used extensively while they were initially learning the various computer applications but were now used only occasionally as a resource. One administrator, commenting on his use of manuals, indicated that "I refer to them every once in a while just to check whether I am going to have to compress my print because it does not tell you on that particular system which report needs wide paper, so as a result I have made a few mistakes there. You check in the manual once in a while." When asked how easy the manuals were to read and understand, an administrator commented, "They are horrible." and later further indicated, "I would not give those manuals to a secretary."

When a secretary was asked whether manuals were ever used as a help resource, she indicated:

> Yes, we have the manual that came with the system and also we have set up our own manual from the year before and changes or anything we do differently we have added to it. Whenever we come to a process that we are doing that we have not done for a year and have forgotten, we can look back in the manual and see what we have done.

When asked if the manual from the software vendor was of value, one secretary felt "it was fairly useful."

Strengths and weaknesses

When asked to comment on the strengths and weaknesses of support services, initially one central office administrator commented, "I don't see any weaknesses right now." Upon reflection, he acknowledged that "because so many school offices are being computerized, we must 'spread ourselves out a little bit thinner'." The impact of support services having to spread themselves "out a little bit thinner" has been felt and noticed by school users.

In commenting on the strengths and weaknesses of computer support services, a school administrator indicated, "I believe the expertise we have in support services is excellent and that is a real strength. They are knowledgeable people. The weakness is

again the lack of manpower." Similar comments were echoed by another administrator who stated "their strength is their knowledge and expertise. Their weakness is their lack of bodies and time. There are certain periods during the year that are just devastating." One secretary stated that "their strength is that they are there when they are available but I just find they are not as available as you would want them to be." Concurring with comments by school administrators, one secretary bluntly indicated, "I think that support services are short staffed."

Change

Central office support for change. One central office administrator commented that he felt that central office showed strong support for computerization but when asked if adequate resources were provided to successfully implement change stated, "Personally I do not believe there is enough."

School-based administrators are in full agreement that the central office has shown strong support for the computerization of the school office. One administrator in particular indicated that "Our board has been very progressive. When we look at all the hardware in this school, it is incredible. It has all been purchased within recent years." With regard to whether adequate resources to implement and support the change have been provided, school-based administrators are less enthusiastic. An administrator indicated, "I think the central office has made an attempt to have the necessary backup there for our schools." Another administrator stated, "I would have to say no. I feel they need more computer support staff."

A secretary, commenting on whether adequate resources were allotted by the jurisdiction to staff, train, and provide for successful implementation of computers in the school offices, said "no" and indicated that she believed that these areas were "short of staff."

All interview participants from this jurisdiction felt the central office showed strong support for computerization of school offices but felt that not enough resources were in place to support the change to computerized systems.

Communicating the reasons for change. In this jurisdiction, individual schools have considerable autonomy and as a result, the central office does not mandate schools to computerize their offices nor does it interfere in the use schools may wish to make of the office computers at their disposal. A central office administrator indicated, "Because we are decentralized, we do not force anything on the schools.". Thus the decision to computerize the school office remains in the hands of the administration of each local school. The initiative and reasons for implementing a change such as computerization must come from the school and they alone must justify its use.

When the administrators of a school show an interest in computerizing their school office, the objectives and benefits are explained by the Office Computer Support Department to the school administrators. All discussions with regard to both initial and ongoing computer change occurs between school administration and the Office Computer Support Department consultants. Secretaries indicated they have little input into the change process and in some instances are unaware of proposed changes until they happen. In addition, there is a lack a knowledge of their school's goals with respect to computerization. When asked to explain how changes take place with respect to computerization, a secretary indicated, "That is done strictly through the administration and I have nothing to do with that. When a change has been made, I may not even know it has been made. For example, they put something on the computer system last week... I do not know what they did." When asked if the reasons for a change and its objectives and benefits were adequately explained, she further commented, "No, we just get it. We wake up one morning and there it is." In another description of how changes take place, one

secretary indicated that:

> When changes are made, there is no communication. There may be a short blurb indicating that this has been done or that has been done, but basically it is done through the administration. They are the ones with the contact, not the workers.

All secretaries agreed that there was a need to be better informed regarding proposed changes and indicated they felt better communication was needed between those implementing changes to existing computer systems. A secretary, when asked if good communication existed between her and those that implement change, said "no" and indicated that any contact was made only with school administration. One secretary, whose job involved being a backup to the primary operator of the computer in the school office, felt changes to computer programs should be communicated both to the primary operator and the designated backup person.

School input into the process of change. Because of decentralized budgets and local autonomy, school administrators have some degree of input into changes which affect their school computer operations. When a central office administrator was interviewed, he constantly alluded to the control that local school administrators had over changes in their own schools. He indicated, "We have not had a lot of experience where something has been forced on the school. It just does not happen that way." Frequent comments made by a central office administrator such as "it is their option," "the staff as a whole has to make the decision," and "it is the decision of the school administrator" emphasized the control and degree of input that schools have over change. The Office Computer Support Department works cooperatively with schools in the selection and evaluation of new software. This was particularly evident in the selection of student records software. In addition, a central office administrator indicated, "We do surveys in the schools to see what applications they may require in the future."

In discussing the choice of a student records program, a school administrator commented on the input of schools by saying, "A lot of schools were involved. There was

a lot of feedback from the schools and there was a lot of testing. Then, there were a number of meetings that were called to demonstrate and promote interest in the student records program among other schools."

When asked whether administrators and secretaries had input into changes which affect their school computer system, it was acknowledged by a school administrator that "Yes, they do." Input and influence by administrators was illustrated by the experience of one school administrator who requested computer equipment which at that time was not on the recommended list for the jurisdiction. He commented, "When we really became interested in computers, I wanted a specific computer and I wanted two or three. We needed special permission and our associate gave it to us immediately. So I think we have input." Further commenting on his freedom and input, the same administrator indicated, "We are given X number of dollars per student and if we do not have something, it is because we did not buy it. We cannot go around pointing fingers at central services any more."

While school administrators indicated they felt they had input into computer changes which affected their schools, secretaries, who are the primary operators of the computer systems, did not feel they had much input in this area. A secretary, commenting on one specific program she utilized in her daily work, indicated, "If I knew a lot about the system, it might be good to have input but I do not know that much about it."

Increasing expectations. Computer support services personnel must deal with new users as well as experienced users with increasing expectations and a desire for more input and control over how their data are reported. One administrator commented on the desire expressed by some schools to modify software by saying:

> We have, of course, schools saying, I wish a report could look like this. We have the capability of customizing some of the reports based on a consensus basis. Again, it is based on the district needs as a whole. We are not in the business of customizing certain things for individual schools. It is time consuming. The maintenance becomes a whole issue. So when you are making enhancements to the software, it is on a consensus basis.

While the central office encourages schools to make the most of their computer equipment and software applications, there is limited opportunity for those school administrators, who are experienced users, to bring about some of the changes they desire. An administrator told of his attempt to be creative and modify his software. He indicated:

> We could probably combine a spreadsheet and this [student records system] and we could come out with a nice grid, a super program I know any school would love to have. I think my son and I worked on it for a Christmas holiday. It is a beautiful thing. It organizes your timetables any way you want, teacher timetables, room timetables, master timetable, by departments, and by alphabetical order.... The people in the Office Computer Support Department certainly have the expertise and could do it,but they do not have the time for it and yet these things are tremendous.

Another administrator, commenting on the ability to customize a computer program, indicated that:

> This particular program has a customizing section and you can produce some of your own information if you know how to manipulate some of the files around. They [Office Computer Support personnel] will give you some help and some ideas on how to do that, but the service, as I said before, for the programming end of it, forget it.

While school administrators acknowledge the overload of the present Office Computer Support Department and appreciate their need to set priorities, school administrators are also beginning to realize that many desires and expectations for change may not be attainable through existing support services. School administrators are likely to experience a degree of frustration and dissatisfaction. One administrator, while not complaining at this point, commented, "Two years ago I wanted just a little programming done and it still has not been done. I am not pushing for it but it would be helpful to us." As was noted earlier, some school administrators have considered employing their own computer programmers in order to meet their needs.

Attitudes towards computerization. None of the administrative participants expressed any negative attitudes towards the process of computerization. This is in part due to the fact that school administrators who to wish to automate their school office must themselves have the initiative, commitment, and the will to finance it. School

administrators who were not supportive of the use of computer technology were under no obligation to implement it in their schools, thus minimizing the display of negative attitudes towards computer change. However, a central office administrator indicated that, on occasion, problems are encountered when a principal who is not supportive of computer technology is transferred to a school with a computerized school office. At this point, the administrator indicated that it then became the responsibility of the Office Computer Support Department to communicate to the new school administrator the benefits of the computer and to encourage its use.

Training

Jurisdictional approach to computer training. Training is provided mainly by two different departments. The Office Computer Support Department provides training on the student records system and training for other office computer applications is provided through Instructional Support Services. Additional training may be obtained by school staff through Continuing Education which is offered during the evenings. Training for the student records system has in the past been provided in the school office on a one-on-one basis. Training for other office applications has usually required release time for those who require training. This training is in small groups and is usually scheduled at high schools that have computer networks.

At present in the Office Computer Support Department, there are two full-time staff members and one part-time staff member involved in training. This training staff includes a former school secretary with a good background in the operation of the student records application used in this jurisdiction. This secretary recently joined the Office Computer Support Department to assist in secretarial training. Formal follow-up is provided when a computer and the student records system are implemented in a school office. Commenting on this follow-up, a central office administrator indicated:

> With the student records system, we use a checklist. When we get to a certain point, the onus is on the school to carry on and typically, if we do not hear from

> them within a week or two, and if they have not been checked off, then we call them back. We would phone to make sure they had done all the things on the list.

Any further contact by the Office Computer Support Department following this initial introductory period is to provide information on changes in procedure or is in response to problems or questions regarding program operation.

Each school has its own professional development policy. If funds are to be allotted for training, then each school decides the extent to which the training costs will be reimbursed. School personnel are not limited to training courses offered by the jurisdiction but are free to enroll in courses of their choice.

When asked if initial training programs were repeated for new staff, a central office administrator stated, "Yes. The school contacts us when there is a new secretary and we will provide the training."

Training of school-based administration. At present, school administrators are not required to have a working knowledge of the student records system. In addition, there are no requirements for minimum numbers of trained administrative personnel on school staff. When a central office administrator was asked if administrators were required to know how to operate the student records program, he indicated only that "it was suggested." When asked if training on the student records system was provided for school administrators, he further stated that "we do provide inservices on the scheduling aspect to administrators because they are the people who do the scheduling....We encourage the administrators to get involved."

School administrators interviewed in this jurisdiction had little or no prior computer experience before entering their present positions. With respect to computer training, one administrator had attended an introductory inservice on the student records system while the other had not attended any computer inservices at all. The latter administrator indicated, "When we talk about student records, scheduling, etc., I think most administrators in high

schools are self-taught. We took the manuals home and spent the summer going through them."

When asked if training existed for school administrators, an administrator indicated, "I think there are inservices when people indicate they need training." Another administrator indicated that while inservices existed, they were "not just for administrators, but for users: administrators or support staff."

Differing opinions exist as to whether there is a need for all school administrators to have computer training. When asked if training should be required, one school administrator stated, "Absolutely, because ultimately, with the network concept, all offices within the school will be computerized." Asked the same question, another administrator stated:

> I am not sure. I think it probably would be helpful but I also think someone that is interested can learn it on their own. In any particular school, there will usually only be one administrator really involved in it. It is nice to have a backup person. Half of the administrators may never get involved in actually setting up directories and using the system other than in a look see situation to get information out.

When asked if there was any backup person for the primary computer operator in their school, one administrator indicated, "Yes, me." Another administrator had the foresight to recognize the potential danger of relying on one trained operator. He indicated that:

> When I started this job, we had one secretary operating the computer and she was the only one that knew what was going on. Everyone else looked at it as being very mysterious. Very quickly I worried about this. What if this person leaves? How am I going to run things?

The potential of being unable to operate the school office computer has led to a recognition of the need for some backup personnel. Each of the school administrators interviewed had been involved in the training of the secretaries who operate the computer systems within their schools and therefore could function as backup operators if necessary.

In addition to realizing the need for a backup operator in the school office setting, one administrator felt a need for more than one trained administrator on staff and indicated that:

> There is a lot that I do and know about the scheduling end that the secretary does not know. So from an administrative point of view, I think they are going to have to get another administrator who is qualified.

One school administrator questioned whether training needed to be a formal, structured process and described the informal way in which he is presently providing on the job training to an interested colleague. While no consensus was reached on whether school administrators should be trained, there was a consensus on the need for backup personnel.

Training of school secretaries. Training sessions on the student records systems for school secretaries are usually half-day sessions. When a central office administrator was asked if this amount of training was sufficient, he indicated, "Yes. It gives them the basics and then we provide hot line support." From the central office perspective, present training methods have been successful. A central office administrator commented, "I think the one-on-one training situation is fairly successful." However, the same administrator continued:

> We would prefer if we could do the one-on-one training off-site because the secretaries have a job to do in the schools and they are constantly interrupted during the training session. So that is one area we would like to see changed.

The feasibility of continuing one-on-one training is presently under evaluation. A central office administrator stated that:

> As more and more schools come on to the student records system, I do not think we can continue to afford to provide [the schools] with the opportunity for one-on-one training as much as we have in the past. I see us moving to small group training.

Evidence of movement towards small group training was illustrated by the design of recent inservices. The same administrator indicated that, for the last six months, they had been providing refresher courses on the student records program on a half-day basis for up to

eight people. When asked if student records training programs were evaluated, a central office administrator indicated "that at present, the training programs were not evaluated" but he thought that training programs on other office applications software "had evaluation sheets."

While formal training is provided for the primary computer operator in the school office, formal training is not provided for the computer backup staff. In addition, minimum numbers of trained secretarial staff are not required or established for each school office. Regarding the training of additional school staff, a central office administrator recommended "that the head secretary and the student records secretary have the responsibility to train other staff."

Periodically, inservices are provided where secretarial staff is released for training. One school administrator commented on training which involved release time by stating:

> Once a year, they have an inservice for all support staff which means that all secretaries leave all schools. That means that all schools are floundering...We get very frustrated...If the secretary takes some pull out time, we would support them going for the training, but when they get back, their work would be waiting for them.

Secretaries expressed some degree of dissatisfaction with the training they have received on the student records system. They indicated a desire for a deeper understanding of the operation of both the programs and the personal computers at their disposal. A secretary, commenting on the student records system, stated:

> I feel there could be better training right from the very beginning, right from turning the machine on, all the way to setting up each aspect of the system. I think you need to start with an understanding, an overview of what this program is doing. When I first started, I really did not know what I was doing.

When asked what would be helpful with respect to the training of new school office personnel, one secretary said that training should be hands on and indicated that "more background information should be provided."

A specific evaluation of the training by the Office Computer Support Department staff could not be provided because none of the schools interviewed had utilized the

training. A reluctance on the part of some schools to utilize the training on the student records program provided by the Office Computer Support Department was noted. When an administrator was asked why formal training had not been sought from the central office staff, he implied that the training was neither adequate nor sufficiently comprehensive. He indicated that the Office Computer Support Department "was so understaffed that it was impossible to get immediate service." In all the schools interviewed in this jurisdiction, new secretarial staff were trained by knowledgeable administrators despite the availability of training from the central office.

A secretary, commenting on the training she received from her administrator, stated:

> I feel fortunate because one school administrator here is very knowledgeable [about the computer] and I have had good training from him. In other schools I have talked to, some of the secretaries have had it dumped in their laps with the manual and they were having problems and were really frustrated.

One advantage of the school administrator doing the training was expressed by a secretary who stated, "He was always there when I had questions." Although the administrators were always there, they were not always accessible. One secretary commented:

> I would get stuck in the middle of something and it was an hour or two before I could ask him [for help]. So it was frustrating starting something and not being able to carry it through. I would get to a point where I did not understand a process and...I would have to wait.

Another secretary indicated that "we would just get started on something and there was an interruption and we would have to get back to it later." This difficulty was also encountered when the Office Computer Support Department did on-site training.

When asked if the technical level of the language used during inservices was appropriate, a secretary reflected back on her experience and indicated that:

> I found that the last one I went to, I understood, but previous to that, when I had first been introduced to this system, it went right over my head for a while. I just had to pick up on my own what they were talking about because I had no experience with timetabling, scheduling, setting up option courses, or some of the phrases used to describe what they were doing.

The same secretary later indicated that it was both the "school-based expressions" combined with the "computer language which presented barriers to understanding. While the assistance given by the school administrator during this training period was described as "very good," the same secretary indicated that she encountered difficulties in contacting the central office for help. This secretary was at that time working only on a part-time basis; when support staff from central office returned her telephone calls, she had often already left for the day.

Training on office software other than the student records program is also offered. One secretary indicated that she had been on a pull out inservice for a word processing program that had not yet been installed on her computer. After returning from the training, she had nothing with which to work. In commenting on the experience, she stated, "You were given a handout of two or three pages which had been prepared, but you were not able to use it because you did not have the program." She also felt that the training period which lasted one day was too short.

Summary

With respect to support services, school-based computer users indicated that they were generally pleased with the interaction between the central office support personnel and school computer users. Issues and concerns, however, did arise and were related to communication, overlap in service, inadequate staffing of the support service department, lack of a proactive capability, and the manner in which support assistance was obtained.

Regarding change, it was noted that the central office showed strong support for the computerization of school offices and school administrators were found to have considerable control over the decision to computerize. The following areas of concern were also identified: the primary operators of school office computer systems had little input and experienced a lack of communication regarding the changes which affected their jobs, and school administration had limited ability to customize student records reports.

At present, there is no requirement for school administrators to have computer training although they are encouraged to acquire training. Secretaries who are new on staff may receive computer training on the student records program through the Office Computer Support Department but none of the administrators in the schools interviewed had utilized the service, instead preferring to train their own staff. Additional training is also available for other office applications through other departments. Issues and concerns with respect to training relate to the way in which training is structured, the depth and background of the training provided, and barriers to understanding faced by new employees.

The major issues and concerns arising from the analysis of this jurisdiction are combined with similar issues from the other jurisdictions in chapter 7.

Chapter 6

Jurisdiction Z

Background

The selected participants in jurisdiction Z in the junior high school setting were from a school with a student population of approximately 200 to 300 and a teaching staff of between 10 and 20. The senior high school participants were from a school with a student population of approximately 1700 to 1800 and a teaching staff of between 90 and 100.

Jurisdiction Z is a medium size urban school board supporting a computer terminal network of 52 school sites with approximately 120 terminals. Schools are only just beginning to interface with the mainframe using personal computers. At present, there are four sites where personal computers are connected to the central office mainframe. As one central office administrator explained, "Our decision over time has been to approach the administrative support function from a network terminal approach rather than a network of personal computers." Access to the computer system then is largely provided through terminals for the purpose of maintaining and updating student records. In a few locations, users may print their own computer reports rather than relying on the central office printing facilities. School administrative computing is limited in this jurisdiction to areas such as student records, scheduling, and the various report applications which are supported by and through the central mainframe computer via the host driven network. The student records system utilized by this jurisdiction was developed by the Data Information Systems Department and, as a result, can be adapted to specifically meet the present and ongoing needs of the jurisdiction. While small schools typically have only one terminal, larger schools have multiple terminals enabling them to deal with their corresponding larger administrative needs. Schools are utilizing computers for administrative purposes which are much broader than the narrow scope supported by the jurisdiction through the on-line terminal system. In addition to attendance, student marks, report cards, and other

functions supported by the terminal system, schools are utilizing personal computers for word processing and beginning to experiment with financial packages. The jurisdiction has compiled a list of recommended computers from which schools may choose when purchasing. At present, with regard to personal computers, there are no system-wide administrative software standards which would allow for the ease of secretarial training, economy through system-wide licensing, and ensuring of data compatibility. As one school administrator indicated, "It has been left up to the individual schools."

Support Services

Existing support structure and practice. Support services are provided for system-wide as well as school-based administrative computing through the Information Systems department. A central office administrator stated:

> The mandate of the department is to supply the administrative data processing support. When I say administrative data processing support, that includes all the normal financial support that any organization would require, general ledger capability, payroll capability, personnel capability, inventory, and different types of warehousing. The difference with us is that we are a school board and therefore we also provide extensive administrative support for the student administration side. That is done through a large student records system that maintains current history records on children from the time they enter the system until five years after they leave the system.

School-based administrative support exists not only for those programs resident in the mainframe computer and utilized by school staff through the terminal system, but also for the hardware and the training necessary to use it. A central office administrator stated that "support covers the whole spectrum of the data processing function, the applications side, hardware and software, through to the day-to-day functional use of the software." The same administrator also indicated that "support is also provided for the running of scheduled production work. Production work is the batch processing that supports the on-line facility." The Information Services department presently consists of fifteen staff members who provide system-wide support.

School administrative users of personal computers and their applications receive no formal support from the existing support services structure and thus must rely on what assistance is available from the instructional side through the teacher resource centre and school-based expertise.

School experience with support services. In order to aid school-based users seeking assistance, calls are screened and funnelled to those who can best provide the user with the answer to their problem. A central office administrator indicated:

> We have our data control people as the front line people who receive all the calls and make specific decisions about who should be involved with solving the problem. They will attempt to make a decision at their level and funnel the call to whoever they feel should solve it.

When possible, the data control person responsible for answering and evaluating user telephone calls will provide immediate assistance without having to involve programming staff.

When asked if school personnel have a good understanding of the kinds of services that are provided by the central office support staff, a central office administrator indicated:

> I think they have an understanding of why we are here and what we are attempting to provide, but I do not think that they have a strong understanding of everything that we provide. Although we are continually trying to narrow a communication gap, there are users who do not realize that we have a significant number of facilities available to them. In some cases, they do not take advantage of some things because they just plain do not know about them.

When asked if the support staff visits schools on a regular basis, a central office administrator indicated:

> That is one of the things we are trying to do but we don't. We have fifteen people who have to carry on the normal day-to-day support function for our department. We do not have the time.... We are not in the schools the way we want to be; we want to be there in a sense of being proactive rather than just reactive.

When asked if support services personnel were easy to contact and prompt in responding to telephone calls for assistance, a school administrator indicated, "Yes, because I know the personnel there and I can contact them when I need them.... I know

whom to contact." School administrators have indicated that contact with the central office support staff has been friendly and that they have been very sympathetic to the problems experienced in the schools. One administrator indicated, "We have not really had any problems [in dealing with the central office support personnel]. They have always responded when we have had a concern and they have been very supportive." When asked if the technical level of the language used by support staff was appropriate, an administrator stated that:

> Initially, there were problems. Everyone hated the computer and the people down there but over the years, it has certainly changed. There is a very positive attitude now and I think the people down there know the type of things the people in the schools are looking for, so there is pretty good communication.

When school secretaries were asked if a telephone directory of whom to call regarding specific problems existed, a secretary indicated:

> No, because it is not that big of a department. There are basically three programmers and all three of them can interchange. If it is a problem with the equipment itself, I telephone the assistant manager. If it is just the day-to-day problems such as attendance or something like that, then I phone another person there.

All secretaries agreed that support personnel were prompt in providing service and were easy to contact when needed. In addition, they also felt the support staff were friendly and sympathetic to the needs and problems that schools experienced. One secretary indicated, "The few times I have called them, they have been very friendly. I went and personally met them and that makes it easier to talk to them on the telephone."

Informal support. Peer or colleague support is provided by school-based staff. A central office administrator indicated that sharing did occur among schools but also indicated there was "individuality." One school administrator stated that "I receive calls from the other schools asking how are you handling this, what are you doing with attendance, or are there some reports that you are using that maybe we could use." In addition, the same administrator indicated that the school registrar received similar calls from other schools and stated that "she is well known to many of the secretaries in other

schools and so they feel comfortable in calling her for assistance." Additional informal support is provided with respect to the problems encountered in the use of personal computer hardware and software by knowledgeable teachers. An administrator stated that "we have a teacher here who is working on his masters and really enjoys solving computer problems, so he is the one we turn to first."

Informal support is available through manuals and handouts provided to each school terminal user. While some manuals are provided by the computer manufacturer, others are prepared by the Data Information System Department. A central office administrator, commenting on the Data Information System Department handout, indicated, "It is not as elaborate as a manual. It is a small folder with a handout in it indicating what has to be done and the process involved." When asked if manuals were available as a source of assistance when problems were encountered, a secretary indicated, "Yes, there are manuals that came with the terminal and with the printer. In all honesty, I find it easier to telephone the Data Information System Department." When asked if users were encouraged to read the manuals, one secretary indicated, "No, because the manuals are very technical. It is easier to telephone the Data Information System Department."

Strengths and weaknesses. Commenting on the strengths of the support services provided, a central office administrator indicated that the "strengths are that we have moved from a very unsophisticated batch environment to a very sophisticated on-line environment very quickly in a two and one-half to three year period." He also indicated that another strength was "being able to be able to provide the kind of support that we do with the number of people that we have."

In discussing some of the difficulties and areas of need, a central office administrator commented on the difficulty of maintaining communication with users by stating:

> Within this organization, we have a very small staff. We have fifteen people in our department servicing all these needs and yet we have a tremendously large network environment that we have to support. One of the toughest things for us to do,

> given our size and the complexity of that environment, is keeping the lines of communication open with those people. It is hard for us. We deal with a lot of people every day with problems but it is hard for us to deal with it from the standpoint of just being able to go out and say, " How is it going? Are there things you would like to have? Is your reporting okay?" We do that as much as we can, but you spend a lot more time actually making sure Joe Smith has what he needs to do what he has to do.

The need to maintain communication with users is in many ways part of the Data Information System Department's higher goal of becoming more proactive instead of always having to deal with problems after they occur. The same administrator indicated that:

> We are not in the schools the way we want to be there. We want to be there in the sense of being proactive rather than reactive. That is what we are pushing for right now, so that we can get our department into a position where we can definitely support the reactive things we have got to do, and also start to concentrate on the proactive things which, until now, we really do not have the capability to do.

He further indicated that:

> We want to be able to establish this proactive capability because, in our eyes, it is extremely critical. We would rather go and talk to somebody ahead of time or have some resource, even if it is a technical resource, to parachute into a given situation before it gets to a point where it is a bad situation.

Most of the areas which the Data Information System Department personnel feel could be improved require that funds be set aside. Three areas were specifically noted. The first area deals with the lack of computer equipment necessary to computerize all school offices. A central office administrator indicated that "we have 35 locations in the jurisdiction that do not have the sophisticated computer technology." He further indicated that "we do not have enough resources to grow as quickly as we should." A second area relates to a lack of personnel. The same administrator indicated that "if we could buy all the computer equipment we need tomorrow, we would not have the personnel to put it in place. " He further indicated that "I have felt for a long time that we do not have enough staff." A third area deals with the adequacy of existing hardware. The same administrator indicated that "some of the hardware technology is not as current as it should be and that puts pressure on us."

A school administrator, commenting on the strengths and weaknesses of support services, indicated, "I would not say there are any weaknesses." Another administrator, while not perceiving any weaknesses right now, indicated "I do not know what will happen in the future. If support services do not have enough personnel and all schools offices are computerized, there could be delays in getting response." One administrator, commenting on the problem of system overload and computer terminal response time, acknowledged that although this was a technical issue, it was one of major problems he had encountered. Commenting on his experience, he indicated:

> One area we had a problem with is overload. Everyone seems to be using the computer at the same time and when it came around to report card time last year at the end of the year, our secretary came back on a Saturday, so she would not be faced with this problem and she found it worked a lot better. When she would try to access the computer system during the week , she found she was unable to....Some allowances will have to be made for people to come back in the evenings or for overtime. We are lucky to have a person who is willing to do it, but in some cases it would not be done. This will definitely have to be addressed.

In commenting on the strengths and weaknesses of support services, one secretary commented, "I am not aware of any weaknesses. Their strengths are that they cooperate, they make an extra effort to do anything they can, and you can telephone them any time."

Change

Central office support for change. Commenting on the degree of central office support for the computerization of school offices, a central office administrator indicated that "the board has been very supportive of what we have been doing." He further commented that "you cannot make any progress if the most senior level personnel do not understand what you are trying to do and are not somewhat supportive." Some frustration was noted on the part of one central office administrator who commented on the inability to provide for the needs of all computer users. He indicated that:

> They give us as much money as they can give us. I know they want us to provide a continually growing sophisticated support but it is based on what they can give us. At some point in time, the line gets drawn....Some people sadly get left either not quite supported the way you would want to support them, or in some cases, they are not picked up at all.

School administrators have indicated that in order to bring about change, the central office has had to show strong support for the computerization of the school office and has had to indicate to school administrators that computer use is to be a priority within the school office. A school administrator, commenting on this area, indicated that:

> They did [show strong support] on the computers. I think it was because they were backed into a corner. Many people were so fed up that they were putting the pressure on the superintendent, saying, "Look, either it works or get rid of it."

He further commented that:

> One of the things that has had to happen was that our senior administration had to turn around and say, "We believe in the computer, the computer is staying and the schools are going to have to use it." The problem was we were not getting the data in from the schools to put into the computer to generate all the reports that people were wanting. When we came to that realization, senior administration was prepared to tell the principals that the use of the computer was going to be a priority in the schools.

One secretary, when asked if the central office showed strong support for computerization, indicated, "I think more now than when it first came in."

Communicating the reasons for change. At present, this jurisdiction has a plan for all schools to utilize computer technology in the administrative area. Initially, although the introduction of the computer to the school office was not readily accepted, this has improved, and now, as indicated by a central office administrator, "it sells itself." Much of the communication regarding the potential benefits of the change has been provided as a result of potential users viewing the benefits that have accrued to schools already using computer terminals. As one administrator noted:

> The next twelve [administrators of schools to be computerized]...already know what is happening; they already sit at meetings with others...who have the more sophisticated capability. Their secretary is still doing [her work] the old manual way and they still see that it takes a long time to do this versus the other guy over here who has his people doing [the work] with the terminal. So they are saying, "How soon are you going to have the computer here?" It feeds on itself.

The same administrator also indicated that "batch users" were continually updated regarding computer use in preparation for the day when they would also have a computer terminal in their school office and be able to enjoy the benefits.

With regard to ongoing computer changes, a central office administrator felt that the reasons, objectives and benefits of proposed changes were clearly communicated to school personnel and indicated that often users were involved in computer program development.

All school administrators and secretaries interviewed from this jurisdiction felt that the reasons, objectives and benefits with respect to both initial and ongoing aspects of computer change were adequately communicated to them.

School input into the process of change. With respect to initial change and ongoing development, there appears to be cooperation, input, and feedback from school-based computer users. A central office administrator, commenting on feedback, indicated that "we get feedback on a daily basis from the people who are interfacing with our applications support people." The same administrator also commented on how input and feedback was obtained from computer users. He stated that:

> We do pilot things so we get some idea of how the users are going to respond to the given applications.... What we have done a few times is used them as guinea pigs with a given application. We will go out [to the school] and give the application to them. Then a week later, we will come back and sit down [with them] and say, "What is happening?" They will say, "This is terrible. Why don't you do this or that?"

Cooperation was also noted with regard to the creation of the elementary/junior high report card which was developed by a joint committee of school administrators and representatives from the Data Information System Department.

Input by computer users which lead to the development of new programs or changes to existing programs was also noted. In describing one way in which user input may bring about change, a central office administrator indicated that:

> The majority of reports in the student records capability right now came from... the user request process where the users will say, "I need this report, I would like to have the data manipulated by you to come out and look like this." That may come

> up in a conversation and we will say, "If you feel strongly enough that you need that, put it down in a user request." Then, what happens is that our department... evaluates that user request. You look at it and say, "This user wants to do it but they are the only user in the whole system that wants it. It is going to cost us this much on a one-time basis to get it in place and this much on an ongoing basis to continue to maintain and support that function. Therefore, for that one user, we do not feel there is justification." There is a process...where we may say "no" and they may come back and justify that they do need it and we may go and do it anyway. But what will normally happen is we will go and talk to some other people and find out very quickly that this user over there would like to have that and... then immediately it becomes a project environment.
>
> If it is just another functional report within student records, it would be picked up by our applications people and the manager would commit the resource and away we would go and put that in place....When we are going to get into a project environment, we are going to start to commit more resources to do this because it is not just a report. It is...a facilities management system which is not just one report but a whole on-line system that we are going to build. Now, because we are going to commit departmental resources to design and build this, we want a higher level of acceptance than just "somebody really needs this" before we...commit those resources.

According to one central office administrator, some changes that require only small program alterations never reach the status of a user request and are made immediately. This is typical of changes made to student records reports. The desire for change to computer programs by a school may be initiated at either the secretarial or administrative levels. As a central office administrator indicated, "It may start out with the secretary and may get solved at the support staff level but, then again, it may not. It all has a lot to do with what we have to do to provide the resource to solve whatever their problem is." An example of a secretary's input influencing change came about when a secretary in the course of her job was required to type out teacher labels. She called the Data Information System Department and, as a central office administrator reiterated, she said, "Why should I be typing all these labels? Can this not be done at the central office?" The result was the development of an application which allows users to print their own labels. A central office administrator, commenting on the increased involvement of computer users in suggesting computer application improvements, indicated that "the aggressive ones continually try and find ways to make their job easier."

All school administrators felt they had some degree of input and influence with respect to changes, particularly in the area of reports generated from the student records system. One administrator, commenting on the ability to have reports tailored to the needs of his school, stated:

> I am always asking for a report this way or a report that way, but that is part and parcel of the fact that I know that these things can be done without too much trouble. I have seen them do it. So I am always asking...and they have been very cooperative.

Commenting on his experience with change, a school administrator stated, "We wanted some changes made on course numbers. The Data Information Systems Department was fairly flexible but they needed some time to get it into the system."

When asked to describe how change takes place, a secretary commented on her experience with program changes and stated:

> Usually, if it is a program change, the particular person that I am thinking of will phone and say, "We are going to be making this change," or if it is a very small change, he will telephone and say, "We have made this change in the program...you will notice...." With equipment [changes], usually the assistant manager will contact us and say, "I am bringing this out [to your school]." As a matter of fact, he was just telling me yesterday, there is something...to take the place of this that is supposed to be better, and they will probably be bringing it in. He said, "If you should be going by the school board office any time, drop in because I want to show it to you and show you how it works." If I do not make it there, he will phone and say, "I am coming out [to the school] with the equipment." When here, he will sit and spend as much time as we need to make the adjustment to the equipment.

Like administrators, school secretaries also feel that they have input into the computer system they operate. With respect to input into program prototypes, a secretary indicated:

> What they will do is set it up and most often, they will come out to the school and say, "This is what we are doing. We would like you to try this, and then give us some feedback on it. If it should be changed, if there is any way you can see it would work better, then let us know." But initially they set it up and ask you to try it for a while.

School secretaries also have input into changes which may affect existing programs. A secretary indicated regarding the programs that she uses that "if it is not working right for this school, then I telephone and the Data Information System Department will change it to accommodate our school." This was illustrated by the following incident recounted by a secretary who stated that:

> When a student brings in a legal name change, we enter it into the computer. It was not printing on the timetable under the student's new name, so I telephoned and said, "It would be handy if this would do this." and by the afternoon, it was set up so that it would be done.

A secretary, when asked if she and the school administrator worked together with respect to suggesting changes in computer programs, stated:

> We will from time to time. For instance, if he is looking for something, he will say, "Can you find out from the computer department and ask them to get on this." If it is something that I want, I will say to him, "This is what I would like to see happen." and he will say, "Fine, go ahead and phone them." If it is something minor that I need for what I am doing, I will phone them directly.

In this jurisdiction, the actual operators of the school computer terminals are encouraged to be in contact with the Data Information System Department staff and through the feedback and input of the operators, the way in which school office computer users do their job can be fundamentally affected. Improvements may not only just be suggested but also implemented. This jurisdiction appears open to suggestions for improvement from all user levels.

Attitudes towards computerization. Initially, the process of computerization in school offices which began in the early 1980s did not proceed smoothly. As a central office administrator indicated:

> The hardest process we had was selling it initially. There was not a lot of respect for the data processing department four or five years ago and there were different reasons for that. Part of it was what was happening in the department, and part of it was the users' acceptance of data processing as a tool to do administrative functions. There was a time where we had to build a relationship with the users. Then when we went in and did the first set of terminals, we went through that process of building acceptance.

In order to deal with some of the early communication problems encountered by the Data Information System Department, a school administrator was temporarily seconded to act as a liaison officer. The duties were, as a central offices administrator stated, to "take over the liaison between our department and the administrative user group." He further indicated that:

> We were having a great deal of difficulty maintaining communication with the users....Because he was an educator, he was able to get through some doors that might be less easily opened to ourselves as technocrats. He could talk at a level with another school administrator...so a lot of things came out that were fed back to us and we were able to resolve a lot of problems that way.

In addition to communication problems, there was a perception among some school secretaries that the introduction of computer would result in a loss of jobs. As a central office administrator stated, "There was the perception originally that 'they are going to put a terminal in here and there used to be two of us and now there is going to be one of us.' But that is not how it works."

Following the initial introduction of the computer system, little communication was occurring between school office computer users and the central office computer personnel. As a school administrator indicated:

> Schools were not talking to the computer people because we were never getting anything out of them. We were having to do everything by hand, so we said...Let's get rid of the computer, save ourselves a couple of million dollars and turn that over to the schools for extra secretaries."

Commenting on his experience as the liaison officer, an administrator stated:

> Someone had to go in from the school's point of view and spend time with the computer people. We were fortunate that our personalities were such that we were very open with one another. It took us about a month to really start to get to know one another and feel comfortable in working together and being able to say, "No, that is not what I wanted." A programmer had just spent three days trying to generate something and you turn around and say, "No, that is not what I wanted." That is the type of thing that had to happen. The report was useless; we could not use it. So, as they began to appreciate the types of reports [that we wanted]...then they could guess as to what we were really looking for, and those types of things began to come.

> One of the very first things that I did when I went down there was to find out what the frustrations of all the schools were at all the different levels, elementary, junior high and senior high. I went out to the schools and sat down with the secretary and one of the administrators, either the principal or the assistant, depending on the size of the school, and said, "What is it that you hate so much about the computer and what type of reports would you really like? This is your opportunity. Just get it off your chest and say it because central office wants to clean it up or they are going to get rid of it, one of the two." Almost every case said, "Let's get rid of it," so we had to come back and say, "We have not given it a chance, so let's look at what you're frustrated about." I made these lists and when I got back, I compiled them, sat down with the administrators and the computer centre people and said, "This is what is happening."

When the communication problems were overcome, the central office personnel showed their commitment to computerization and schools began to maintain the accuracy of their data. Attitudes began to change. As a school administrator stated:

> Once we got school doing that and as more and more reports matched up, we sent these out to the schools, they were able to see that we were able to provide some reports for them which were accurate. They began to see the usefulness and began to have a little bit of faith in the fact that it could work, given the cooperation.

Initially, some secretaries had been less enthusiastic about school office computer use, fearing it would mean even more work. A secretary noted:

> I know when they first started putting [computer] terminals in the schools, they [secretaries] felt it was going to be extra work. I had worked with them for a while at the time and my advice was, "Try it out. I love it. I would not be without it." I have since talked to some who had complained the loudest. [Now] they would not want anyone to come and take their [computer] terminal away.

Much of the change in attitude among school office personnel is due to the improvement in speed and office productivity. As one secretary noted:

> We used to write and write and write, and fill out forms galore and it would all go the central office to be keypunched. Now we do that here, so it stopped the writing now. Others have said this too. You actually can look into the [computer] terminal and get a report back and see what you have done. It gives you a feeling of accomplishment that days and days of writing does not. The turnaround time now is instant. At one time, the turnaround time used to be--well, it would take a day to go down and they would have to keypunch it and it could be four or five days before you got anything back and sometimes a week. This way it is instant. It is there and you know that it is.

When asked if she still noticed any resistance in the school office to computer use, one secretary said "yes." She further indicated that "I think it is just the individual. Some

people do not like change and that is my personal opinion. From the way they talked and reacted, that is what it is."

Training

Jurisdictional approach to computer training. Financial assistance is available for the training of school secretaries on personal computer applications, thus allowing for some reimbursement of the training costs. Since there is no standardized personal computer software for school office use and schools are using different software applications, no system-wide office software training is possible. At present, schools select their own office software and must arrange their own training for staff or enroll staff in courses that cover the packages they have selected for their respective schools. Some training has been arranged between schools, but at present no system-wide coordination of office administrative computer training exists.

Training on the student records program is provided to all schools that are presently on the computer terminal system. Training is conducted either on a one-on-one basis or in a small group of three to five people and is specifically geared to the work needs of the individual school users. Generally, training is directly hands on and usually occurs on-site. A central office administrator described the approach to training in the following way:

> The first thing we do is come in [to a school] and install the [computer] terminals and get the network up and working. We will test everything live, and then we will know that all the applications are working. Then, on a scheduled basis, we will come in and train each of the users....We come in for a day to two days depending on the people doing the training and when we walk out the door, they are using the system. Then what we do is a kind of a hand holding process where our people who are records support people or our coordination people work with those users till they are comfortable and able to stand on their own.

Half day or full day inservices are provided once a year for different user groups. These were described by a central office administrator as "training sessions." The same administrator indicated that "although they are training sessions, they are two-way. We teach some things they have to know, changes or whatever, and we also open it up to discussion to get their perception of things." Training is done by the same people who

build the system. The reasoning behind using the system developers in the training process is, as an administrator from the central office indicated, "it is nice to have the people who are responsible to those school office users do some "hands on" computer training with the users and then they have a really good understanding of whether their screens are actually user friendly." In commenting on the present training process, the same administrator indicated that the major weakness was "lack of time." He continued by indicating that "we probably do not spend as much time as we should on the training process. Users are out there 'riding the bicycle' much faster than they should be but that is a fact of life."

Ongoing assistance for those having difficulty adjusting to the use of the student records system is available. An administrator from central office indicated:

> Others, for whatever reasons, do not adjust to it [the computer] quite as quickly. Therefore the "hand holding" is longer, and we do not disconnect that "hand holding" process. If they require more, then we give more, even if it means going back out [to the school] again, and going back through the training process. Obviously it is in our best interests that at some point in time, and hopefully the shortest point in time,... that they become capable of doing their job day-to-day without interfacing with us. If we have a user [in a school office] who is not phoning us, not requiring help, then our resource can be doing something else.

The training program is repeated for new school office staff when required, but as an administrator indicated:

> We want to try the best we can to get the school users involved to the point where they realize that it is partly their responsibility to carry forward the training of their own people internally.... If that is not functionally available for whatever reason,... then we bring people in and will go through exactly the same process as if they were just starting up.

When asked if supplemental training is provided for school office users when computer hardware or software is enhanced, an administrator indicated:

> Yes. It is done either through the inservicing process where you will bring up some new type of application facility of hardware or whatever, then the inservice will go through that with the whole group of them. If it is a certain user group, we will interface directly with them. If it is terminal devices, hardware, or a specific application that is targeted at a small user group, we would go in and train those people in that specific function or at least supply direction and guidance through handouts. That is again depending on the skill of those people. If they are already skilled terminal users and understand the interface and the menu function etc., all it is now is that we are providing them with the next little portion to the application...

> .You can just send them something in the mail that says effective next Monday you are going to be able to do this.

At present, there is no formal evaluation of training offered on the computer terminal network and any feedback received is obtained through informal contact with the Data Information System Department support personnel.

Training of school-based administration. None of the school administrators interviewed in this jurisdiction had any prior computer experience before becoming an administrator. Of the two interviewed, only one presently used the computer directly while the other depended upon the school secretary to operate the system and supply him with the necessary reports. When commenting on who received computer training on the terminal system, a central office administrator indicated that as many school administrators as were willing were trained. At present, this jurisdiction encourages administrators to be involved in computer use but it is not mandated nor are there any minimum numbers of trained personnel established for each school. When asked if all school administrators should have the necessary skills to operate the computer, a school administrator stated, "Frankly, I think that everyone should." Another administrator, responding to the same question, said, "No... I do not feel they should have to [have computer skills] because you cannot be an expert in every field. There have to be people that you can rely on."

The major reason for providing a backup computer operator is to ensure that school operations will not be affected should the primary operator no longer be available. Commenting on the provision of backup personnel, a central office administrator stated:

> We make recommendations to each one of the locations where we are involved with this technology that they should not leave themselves in a position where they have only one person who can understand and carry on the day-to-day function that has to happen. If they do, they open up a huge window of threat to themselves where they are not going to be able to stand on their own to do all these things that have to be done.

Administrators in some schools can access and maintain the school computer system should the primary computer operator be absent. In the schools interviewed in this jurisdiction, one administrator is trained and could provide backup if necessary and one

could not. In one school, the administrator indicated that "our registrar does all of the reports. If she is absent, we have another office staff member who has been trained as backup." In another school, when asked if there was someone who could operate the computer system if the primary operator left, an administrator stated, "No. We have a a part-time lady who comes only once a week and she would be a little bit familiar [with the computer] but she is not here all the time." When this same administrator was asked if he felt it was important that there be backup, he stated, "It would help if there could be someone here but you cannot have backups for every area of the school, so I do not feel that would be an important factor."

Training of school secretaries. When asked if the pace of support staff training was adequate, a school administrator thought from the feedback he had received that the pace was fine. He also indicated that the training "is geared to us individually." The same administrator, when asked if there was any problem with the level of the language used by training staff, stated, "No. That is one of the things they are aware of now....They have to use a level of language that will be meaningful to us." Another administrator commenting on his secretary's training experience indicated that "she did not have any trouble."

Secretaries responded positively regarding the training they had received. A secretary indicated that time spent by the Data Information System Department staff on training was flexible and dependent on how much training each individual needed. She further commented that "they go at a pace you can handle" and indicated that "they put it in very common everyday language that is easy to understand." When asked if the training was successful, a secretary said "yes" but indicated that:

> The interest has got to be there. If you are not interested, it is going to take that much longer to learn. If you are at all enthusiastic and interested, the Data Information System Department staff are a tremendous amount of help and yes, they will spend as much time and go as deeply into it as you want to go.

Summary

School-based computer users were very satisfied with the support services provided within this jurisdiction. However, some issues and concerns were related to the need for a proactive response on the part of the support service department, lack of personnel, and the adequacy of existing hardware.

With regard to change, there appears to be opportunity for both school administrators and the secretaries to have meaningful input into the changes which affect their jobs and the school. Support services adequately deals with the issue of user input into change. All levels of users are encouraged to be in contact with the support department and to actively suggest improvements. Although this atmosphere of mutual cooperation between the schools and support services has not always existed, its development has led to greater satisfaction with support services on the part of school-based users.

All school-based personnel interviewed for the study were satisfied with the training they received. However, several issues and concerns with respect to training were identified and relate to the lack of recommended system-wide personal computer software, the lack of coordinated training programs for all personal computer office software, and the lack of evaluation of the training provided on the student records system.

The major issues and concerns arising from the analysis of jurisdiction Z will be combined with those of the other jurisdictions in chapter 7 of the study.

Chapter 7

Summary and Synthesis

Introduction

The purpose of this chapter is to provide both a summary and a synthesis of the major issues arising from the analysis of each jurisdiction. The chapter will be structured to deal with the issues specifically but with full knowledge that any one issue may have ramifications which can apply to a broader context.

Support Services

Obtaining service. When school office computer users encountered problems with their computer hardware or software, they contacted individuals within their respective support service departments. Generally, users indicated they contacted the two or three support personnel they knew either through work situations, training, or the grapevine. Users in jurisdictions X and Z indicated contacting the individual who set up their computer systems, while others have indicated contacting the one who initially trained them. In all cases, those seeking assistance were contacting support personnel directly. This method of obtaining service may not lead to the most efficient and effective use of support personnel. Obtaining service from a person who installed the computer equipment may be inefficient because the assistance sought may not be part of that individual's mandate. This may lead to an increase in their work load and service response time may be decreased. The person with the expertise in the area of difficulty may not be utilized by using these selection methods. Jurisdiction Y is planning to establish a problem hot line through which all users of computer equipment can be prescreened and then directed to those available and most capable of providing the required service. The practice of allowing users access to support personnel of their choice eliminates the ability of support departments to monitor the number and nature of the calls requesting service.

Peer and colleague support. Knowledgeable personnel within a school were often sought out by those in their own school and by others seeking assistance. This informal peer or colleague support was found to occur in each of the jurisdictions examined. School personnel reported incidences of peer or colleague support being provided, not only within and between schools in their respective jurisdictions, but also to those in other jurisdictions. Some recognized the value of this growing resource of competent computer users. An administrator from jurisdiction Y reported that one software developer capitalized on this resource by using knowledgeable users to present workshop sessions for colleagues. Although all jurisdictions acknowledged the existence of peer and colleague support and were aware that it is occurring within their jurisdictions, very little other than verbal encouragement has been given to promote it. Secretaries from jurisdictions X and Y clearly called for more opportunity to communicate with their peers. A secretary from jurisdiction X pointed to the lack of time to share with peers during regular work hours and pointed to the reluctance of conference organizers to schedule opportunity to share and exchange ideas. A central office administrator and a secretary from differing jurisdictions suggested that it would be valuable to visit other schools in order to observe how they have used their computer systems and to obtain other ideas. The utilization and fostering of such contact between users needs to be encouraged and promoted in practical ways. The potential benefits of peer and colleague support are that it not only contributes towards computer literacy but may reduce some demand on support services, lead to more effective computer use, and promote feelings of confidence and accomplishment among users.

Structure of support service departments. All the jurisdictions that participated in this study faced problems arising from the narrow focus of their central office computer support departments. These problems have been exacerbated by advancements in personal computer technology. When these computer departments were established, all administrative computing revolved around the mainframe computer. With the advent of the personal computer, there has come a rapid proliferation of software that can be used for

administrative purposes. Today, with the growing acceptance and use of personal computer technology for administrative purposes, school office computer users are no longer limited to the mainframe environment. In many cases, the use of both personal and mainframe computers in conjunction with one another is now commonplace. In most of the jurisdictions examined, the responsibility for school administrative computer use, other than the student records application, had been excluded or relegated to other central office departments. This fragmentation is both unnatural and difficult to maintain particularly as modern software increasingly allows for school office computer users to share and manipulate data from either the mainframe or personal computer environments.

In jurisdiction Y, the Office Computer Support Department evaluated and made recommendations for the approval of software and Instructional Support Services Department provided the support and training. Both departments received user questions on the operation of the same spreadsheet program. In jurisdiction X, personnel from Planning and Development and Instructional Support Services had been consulted by school office computer users regarding the operation of the approved word processing application. With respect to the student information system, personnel from three departments, Planning and Development, Data Information Systems, and Instructional Support Services had in part provided some similar services. These overlaps in service emphasize the unnatural separation of responsibilities in existing departments. In jurisdiction X, the potential for conflict identified between the instructional and administrative areas of computing due to advancement into areas of mutual concern supports the need to restructure departments in order to deal with the needs of all administrative computer users. Personal computer-based word processing, spreadsheets and data bases are as much a part of administrative computing as their mainframe counterparts.

Proactive capability. All three jurisdictions had directly or indirectly indicated the need to be more proactive. Support services personnel from jurisdiction Z commented on

the need to be proactive, resolving potential problems before they became a "bad situation." Jurisdiction X had initiated a regular school visitation program by a support person to provide better communication, feedback, and to promote awareness of the current situation among school users but had been unable to maintain this program. Jurisdiction Y had noted the need to be more proactive by keeping ahead of the needs of school-based users. They had found that, in some cases, school personnel wanted to implement new technology before the central office support staff had had time to adequately test and learn how to use it. At the time of this study, support service departments had mainly only been able to respond to immediate problems and had not yet been able to be proactive by dealing with difficulties and user needs in advance.

Support service staffing. In jurisdiction Y, all participants interviewed indicated that support services were understaffed. Although school administrators had no complaints about the promptness of service, secretaries did. Reflecting on their experience, secretaries pointed to a lack of communication following service calls and complained about the difficulty of contacting support personnel. Once support personnel were contacted by telephone, the secretaries perceived a lack of promptness. Considerable sympathy for the difficult situation faced by support services personnel was expressed by both school administrators and secretaries. School personnel felt that support service departments "tried their best" but were "spread too thin" for the number of schools they were servicing. School personnel in jurisdiction Z were satisfied with the service they received but one administrator questioned if, when all schools were connected to the computer system, support services would have enough personnel to provide the same present level of support without users experiencing delays. A central office administrator in this jurisdiction had thought for a long time that his department did not have enough people to perform the tasks required.

Change

Change and communication. A central office administrator from jurisdiction X implied that since computerization was "a fact of life," it was not necessary to explain the reasons, objectives, and benefits of the change to those who would ultimately use it. This attitude clearly runs counter to all the literature which indicated that communication is an important and vital area to which implementors of change need to pay attention. Connor and Lake (1988) pointed out "change targets may resist because they simply do not understand the need for change, the substance and details of the change, and the consequences of the change" (p. 119). Dalziel and Schoonover (1988), moreover, commented that "the most effective leaders recognize that the objectives for change must be clearly communicated" (p. 32). Although all administrators indicated they received adequate communication regarding the reasons, objectives and benefits of proposed changes, secretaries did not. A central office administrator indicated that secretaries were likely not aware of the overall plan. Secretaries from jurisdictions X and Y indicated that they received no communication regarding change and that when changes did occur, communication was only between the central office and the school administration. Reflecting on her experience with change, a secretary stated, "No, they do not communicate with us in that respect at all." and another indicated, "My feeling is that all this was implemented for the sake of the central office." Carlson, cited in Peters and Waterman (1982), stated that "nothing is worse for morale than a lack of information down the ranks" (p. 267).

User input into change. User input into the initial and ongoing process of change is essential. During the initial planning stages, jurisdiction X in conjunction with computer departments had involved school administrators in steering committees responsible for formulating the direction of administrative computing. Unfortunately, secretaries whose jobs were most affected by computerization had not been involved. Watts (1987) stated that the involvement of those most affected by a change in the planning process "allows

them to better understand the change, to see why it is being made, and to learn what to expect. This reduces the unknowns and helps overcome resistance" (p. 185). The continued involvement of school administrators is expanding as they become computer literate and more informed about the capabilities of their computer systems. School administrators in jurisdiction X had recently had considerable input through pilot projects, involvement in prototyping of new programs, and involvement in steering committees and user groups. While these were positive steps, secretaries, the primary computer operators, had yet to be formally acknowledged and included in the process. Plans, however, to involve secretaries and other school support staff in the selection of personal computer-based accounting packages had been mentioned and is a progressive step toward increasing user involvement. At the time of this study, secretaries felt they had little involvement or input in changes that affected their work. Secretaries indicated that any contact by central office personnel with respect to change was strictly with the school administration. It was indicated that change at times had been a surprise. A secretary indicated, "We wake up one morning and there it is."

In jurisdiction Y, the power to affect what computer changes are made in the schools rested mainly with local school administration. Although there was considerable input at the administrative level, there appeared to be little by those who actually use the computer equipment.

In Jurisdiction Z, school administrators have had input into the development of the student records system and have had direct impact on the type of relationship now enjoyed with the computer department. Initially during the early years of computerization, little contact was occurring between the computer department and school users and the use of computers as an administrative tool was not being well received. The lack of communication precipitated a crisis which led to the awareness by the computer department of the need to build a cooperative working relationship between themselves and school-based computer users. Through the efforts of computing personnel and a seconded

administrator acting as a liaison between school-based users and the computing department, an attitude of mutual cooperation was developed. As a result, both school administration and secretarial staff felt they had substantial input into the changes which affected their computer system. Secretarial staff had been formally involved in pilot testing, initiating changes to computer programs used by their school, and providing feedback. In addition, they had been encouraged to meet and deal directly with computer support personnel. As a result, the computer department appeared to be open to input from users of all levels and actively sought user input in the process of change. The literature supports this cooperative approach to change.

Fullan (1982) indicated:

> Innovators need to be open to the realities of others: sometimes because the ideas of others will lead to alterations for the better in the direction of change, and sometimes because the others' realities will expose the problems of implementation which must be addressed and at the very least will indicate where one should start. (p. 82)

Increasing expectations. Increasing expectations were noted in two areas, the first of which affected secretaries and related to the ever increasing number of tasks and demands which they face because of the computer's possibilities. A central office administrator from jurisdiction X expressed a concern with respect to the changes that computerization has brought to secretarial jobs. This administrator indicated that "It is like curriculum. We keep adding on but we never take anything away." A secretary indicated that the computer did not save time because everyone expected more. Secretaries were continually having to learn new software applications and as a result were having to deal with a never ending increase in people's expectations for service which these innovative tools promote. A secretary from the same jurisdiction, speaking of central office, stated, "I think they have lost touch as to the demands on the support staff in the school situation." The literature indicated that planners of change need to understand and appreciate the reality

and the situational constraints that affect those who must live with their changes. Fullan (1982) indicated that:

> One of the basic reasons why planning fails is that planners or decision-makers of change are unaware of the situations which potential implementors are facing. They introduce changes without providing a means to identify and confront the situational constraints, and without attempting to understand the values, ideas and experiences of those who are essential for implementing any changes. (p. 83)

The second area related to the growing literacy of some school users and the awareness of the potential of the computer. These realities resulted in users putting pressure on support service departments to assist them in customizing and modifying applications to meet their specific school needs. Users from all jurisdictions commented on their desire to make the programs more useful and produce reports which are tailored to their needs. Computer departments had been open to some changes but had not embraced the desire for changes with enthusiasm. A central office administrator for jurisdiction Y stated, "We are not in the business of customizing certain things for individual schools." Jurisdiction Z, on the other hand, welcomed user input into the customizing of reports and required a high level of user consensus only when the job required building new applications and the commitment of significant resources. Knowledgeable administrators in this jurisdiction had been aggressive in maximizing the potential of the student records system. An administrator indicated that he frequently asked for customized reports and had found the computing staff very cooperative. The ability to modify and customize user applications to meet present and ongoing needs is desirable in modern computer programs and the willingness to provide this assistance is consistent with the information centre approach to support services.

Attitudes towards computerization. While all computer users in this study were found to be supportive of computerization, a few alluded to others of their colleagues who were not so enthusiastic. The provision for local school autonomy in Jurisdiction Y allowed administrators to decide if they wished to implement computer technology.

Although leaving the decision to computerize the school office to the discretion of local school administration allows for individual preferences, it only postpones the inevitable and frustrates the aims of the senior central office administration which has expressed support for computerization of school offices. Jurisdictions X and Z had indicated that computer use would be mandatory among their schools. This authoritative approach, required strong central office support and initially alienated some personnel. In one jurisdiction, it was reported that some support personnel quit their jobs to avoid having to learn how to operate the new technology. Perhaps these problems could have been avoided had more sensitivity and care been given to the areas of communication and implementation. Commenting on resistance to change, Dalziel and Schoonover (1988) stated that:

> People resist change for a variety of reasons. Some people's previous negative experiences teach them that change is hazardous and harmful. Others may not see the rationale for change; they are content with the status quo. Others resist because the reasons for change are not clearly communicated to them. They have no logical basis for accepting a different way of operating. (p. 32)

An administrator indicated that one of the major obstacles to change was "working with the attitudes of the people and getting them to accept change." It was noted also by one administrator that "within the school setting, there is the attitude 'I have always done it this way'." Changing the attitudes of staff is no easy task; therefore change agents must actively sell the change and endeavor to cultivate positive attitudes towards it. In this regard, Evans and Wilkinson (1983) stated that:

> Rather than simply introducing technological change as a management decision, many firms make special efforts to provide as much information as possible to staff about the equipment with the objective of selling the idea to them and gaining their early commitment. Indeed many companies stress the importance of a good communications system in influencing employee attitudes to technological change. It is also important that the information provided should give as wide a picture as possible of future plans as well as detailing immediate changes so that employees may be encouraged to accept change as a normal and continuing process. (p. 35)

In spite of the initial problems with the attitudes of some employees, a central office administrator in jurisdiction X pointed to an increasing number of school administrators wanting to receive computer training. Although not necessarily indicating changed

attitudes, this does indicate that at least school administrators are resigning themselves to its use.

Training

Approach to training. Existing training practice in all jurisdictions has been to utilize one-on-one or small group training sessions. Training on pupil records applications has been accomplished either through the release of staff from the school for training during the day or on-site training. While one-on-one training had been used extensively by jurisdictions Y in this area, it was noted that as more school offices are computerized, small group training is becoming a more viable option. No one training method was ideal; therefore jurisdictions must use what meets their needs. At the time of this study, there was no evaluation of any of the student records training programs in any of the jurisdictions. This lack of evaluation prevents the feedback necessary to improve existing training. In jurisdictions X and Y, training for other office software applications such as word processing or spreadsheets were offered to existing school staff during the day via pull out training sessions or in the evenings through Continuing Education. Jurisdiction X utilized and actively promoted the Continuing Education courses to prospective employees. By doing this, potential employees could be trained in the necessary computer skills before they were hired.

Jurisdictions X and Y recommended system-wide software for personal computer administrative use. At the time of this study, this included software for word processing and spreadsheets, with plans to expand to include an integrated package, a data base, and desktop publishing. This practice allows for bulk purchasing, the negotiation of system-wide licences, and the establishment of training courses designed and tailored to meet the specific needs of the jurisdiction. In jurisdiction Z, schools were free to select the software of their choice making system-wide training impossible and leaving schools to make their own training arrangements.

Training of school administration. A considerable difference of opinion existed regarding the computer training of school administrators. Central office administrators in all school jurisdictions encouraged school administrators to become familiar with the operation of the computer system in their school but have yet to mandate required numbers of trained administrative personnel for each school. When asked if all administrators should be required to have computer training in order to operate their computer system, three administrators said absolutely, one indicated it depended on whether they are going to be using it, one was unsure but felt it would be helpful, and one said "no" indicating, "You cannot be an expert in every field."

The major argument, however, in favour of having computer trained school administration is that those with training are better equipped to make sound management decisions. Millar (1988) indicated that "an administrator's decision-making is greatly enhanced by having quick access to more data" (p. 11). Radin and Greenberg (1983) indicated that when school administrators through computer use have instant access to a wide variety of information, "the process of informed decision-making is thereby enriched" (p. 111). Bluhm (1987) further indicated "if an information system is lacking, an administrator is forced to rely upon incomplete data or the opinions of his/her subordinates and associates. If the information shared is biased, poor decisions may result" (p. 6). The implication for school-based administration intent on making sound decisions is that they need personal, quick, and easy access to accurate, reliable, timely, relevant, and complete information which computer systems have the potential of providing. Modern personal computer systems also allow school administration to customize and tailor reports to suit their specific needs and arrange and reorganize the data in a summary form that is easy to digest and analyze.

In addition, the use of electronic mail can effectively contribute toward improving communication and increasing productivity by decreasing time lost as a result of attempting to contact other personnel. Bluhm (1987) stated that "managers who use the computer

reported they have become more analytical and now ask better questions" (p. 19). Hansen, Klassen, and Lindsay, cited in Bluhm (1987), commented on the impact computer information systems have had upon school and school district administration by stating "computer use facilitated more effective resource management, better decision-making, better long-range planning, and more time to work with people" (p. 20).

A school administrator from jurisdiction X, commenting on whether there was a need for school administrators to have computer training, stated:

> Absolutely! It is necessary in order to understand how we can better do our job with the aid of computers. It is really important to know what the computer is useful for and what it is not useful for.... The only way that that understanding can be gained is with some personal experience and understanding of the various computer applications. I believe that administrators must be trained and must be involved in computers in order to make the proper use of them in their field.

Bluhm (1987) concurred with this view and further indicated that "principals and superintendents, as the educational leaders in the schools, need to be computer literate if they are to be in the forefront in having computers used effectively for instructional and administrative purposes" (p. 20).

The present lack of computer literate administrators may have a profound impact on the ability to maximize the benefits of the office computer. In addition, schools that lack computer trained administrators or backup operators are at risk of not being able to access the school computer system and the information needed for daily operations. This problem is encountered when the primary computer operator is absent or has resigned. Examples of such occasions recounted by central office personnel in jurisdiction X and by an administrator in jurisdiction Y indicated the reality and seriousness of this problem.

Montgomerie and Richards (1988), in discussions regarding the use of integrated computerized administrative packages, noted that administrators "feel there is a lack of opportunity to learn how to use such packages both before and after they are purchased" (p. 2). If school jurisdictions plan to continue strongly supporting the use of the computer

in the school office and encouraging its use by school administration, adequate opportunity and access to training is necessary.

Training of school secretaries. Problems associated with the training of school personnel have resulted because this whole area is new and the central office personnel in school jurisdictions are still grappling with how best to meet the needs of their jurisdictions. The areas of concern raised by central office administration, school administrators, and secretarial staff cover a wide range of issues. Concerns had been raised about pull out training. Central office personnel involved in training indicated that on-site training was undesirable because of interruptions. Although school administrators were supportive of computer training for secretaries, they complained about the effects of releasing secretaries for training on the school at large. In addition, secretaries complained about the work load when they return following training. With respect to the pace of training, secretaries complained about the speed at which material is presented. Those who had a good background and understanding of the computer and the school context complained that the pace was too slow. Others new to the jurisdiction were frustrated by the language and terminology and desired that training proceed slower. Still others felt the training was just right. Some secretaries, after several months of working with an application, wished they could retake courses and others indicated a desire for a follow-up session in which trainees could get together and share their progress and problems. A secretary expressed a desire for a better understanding of the computer system and another indicated that better background information should be provided. Some secretaries indicated training periods on specific applications were too short while others were satisfied. The various feelings expressed by those who have personally been involved in training programs or have been in some way affected by the programs emphasizes the difficulty in meeting the needs of all concerned. Evans and Wilkinson (1983) stated that "clearly the quality of training provided is a critical part of the change process and requires careful planning at the outset" (p. 25). A lack of attention to training can have serious

consequences and as Dalziel and Schoonover (1988) indicated, "most total failures in planned change can be linked to little or no training" (p. 118). An administrator from jurisdiction Y trained his own secretarial staff because the training provided by central office was perceived to be inadequate and immediate training for new staff was difficult to obtain. Mankin et al. (1988), commenting on the findings of three studies by the Rand Corporation, further indicated that:

> The most successful training programs we found featured an eclectic mix of resources and procedures that can be adapted to employees' widely varying interests and skill levels. This approach has the added advantage of being able to accommodate the varying rates at which users' needs and skill levels change. (p. 76)

Chapter 8

Recommendations and Suggestions for Further Study

Introduction

The final chapter consists of the recommendations for practice which fulfill the final purpose set out for the study. These recommendations deal with the issues and concerns arising from the research.

Recommendations

Support services. It is recommended that jurisdictions consider implementing an information centre approach to computer support services. This approach to support services can effectively meet the technical and support service needs of all computer users. Martin (1984) indicated that:

> The information centre is a management concept that can support a variety of means of delivering computing. Sometimes the vehicle is a terminal connected to a time-sharing system. Sometimes it is a shared minicomputer. Increasingly in the future it will involve personal computers. (p. 104)

The information centre is designed to serve mainframe, personal, or minicomputer users directly and speedily. As the sole source of assistance to computer users, the information centre can prevent service overlaps. Because support personnel serve the organization as a whole, they are ideally situated to act as a buffer eliminating potential conflicts between departments due to advancement into areas of mutual concern. In addition, this approach can help to prevent fragmented technological solutions, assist users in the selection and implementation of computer applications, and eliminate confusion on the part of users seeking assistance. The information centre approach provides jurisdictions with an ideal vehicle to make the transition to computerized school offices as well as to provide for future needs through ongoing development. Personnel involved in the information centre should be knowledgeable in the use of existing computer hardware and software and should possess exceptional communications skills. In discussing the steps to developing a successful information centre, Oglesby (1987) indicated that information centres should be

"creative and seek out opportunities to apply...tools and technology in new and different ways" (p. 74). As a result, this support services arm of a computer department can become an effective change agent promoting, guiding, training, and assisting end users to adjust to all aspects of computer change.

The information centre approach is recommended because it is designed to be proactive rather than just reactive. In light of a growing sophistication among school-based computer users, there is a need to establish this proactive capability in order that support services can keep abreast of technical advances, engage in research and development, and maintain an ongoing liaison between themselves and school-based computer users. The maintaining of effective, ongoing communication and contact with users is inherent in the information centre approach and ensures that minor difficulties are handled before they become major problems. In addition, the information centre encourages the utilization of competent, school office personnel who can effectively act as a liaison between application developers and other school-based computer users. School office personnel can also represent the interests of their peers as active members of the team involved in the creation, development, and prototyping of new user applications. Martin (1984) indicated that information centre personnel can "work hand in hand with end users to create prototypes, constantly adjusting and expanding the prototypes" (p. 111). The result is the development of new computer applications in which users will have confidence and be able to operate successfully.

Dalziel and Schoonover (1988) pointed out "a basic axiom of any change effort is that the further away the people defining the change are from the people who have to live with the change, then the more likelihood that the change will develop problems" (p. 59). The information centre encourages contact and cooperation between school office computer users and computer programming personnel. Thus the proactive capability, ongoing communication and contact, and the active involvement of users associated with an information centre approach to support services may contribute significantly toward

changes which are better suited to the needs of end users and better able to respond to their needs.

It is also recommended that jurisdictions, in conjunction with implementing an information centre approach, should consider the implementation of a problem hot line to direct those seeking assistance to the support personnel who have the expertise and the responsibility to deal with the area of concern and to enable monitoring of the number and nature of the requests for service.

Peer and colleague support. It is recommended that, in addition to encouraging school-based computer users to take advantage of the knowledge base found in peers and colleagues, jurisdictions should actively provide opportunities for both peer and colleague interaction through visits to other schools, scheduling of structured interaction during inservice days, workshops and training sessions, and where possible, utilize school-based expertise to assist in the presentation of seminars and workshops.

Support service monitoring and evaluation. In efforts to determine and monitor computer support needs, it is recommended that jurisdictions establish a mechanism whereby the degree to which support services are being used can be ascertained and to evaluate the quality, promptness, and degree of user satisfaction with respect to the services provided.

Change and communication. When change is planned, it is recommended that jurisdictions ensure that the reasons, objectives, and benefits of a change are clearly communicated to all involved and that the communicator does so with clarity and sensitivity. Fullan (1982) indicated that "many innovations are attempted without a careful examination of whether or not they address what are perceived to be priority needs" (p. 57). Dalzeil and Schoonover (1988) moreover indicated that "all too often...change is guided by reactive initiatives or wishful visions, rather than planning based on sound principles" (p. 13). With regard to computerization, it is important that the implementation of computers in school offices be in response to priority needs which are clearly and

specifically identified and based on sound planning. Fullan (1982) further indicated out that "if specific needs are identified and those who are supposed to implement change disagree with the needs, not much change will result" (p. 57). In addition , Connor and Lake (1988) pointed out "change targets may resist because they simply do not understand the need for change, the substance and details of the change, and the consequences of the change" (p. 119). Questions voiced by one secretary asking, "Why are we doing this? What is wrong with my way of doing it? Why change it? " are legitimate and deserve an answer if support for change is to be expected. Thus it is incumbent upon those promoting change to not only demonstrate that the need exists and clearly communicate the reasons for the proposed change but also to clearly articulate the objectives and benefits. Dalziel and Schoonover (1988) indicated that "the most effective leaders recognize that the objectives for change must be clearly communicated" (p. 32). Diffuse goals or objectives lead to change efforts which are unclear, leaving those who must implement the change unsure what it will mean in practice (Fullan, 1982). The lack of clarity with regard to a change effort arises from insufficient attention paid to the specifying of goals of the change and the means to achieve them. Those responsible for implementation must ensure that goals of the change are clearly specified and clearly communicated to those who will implement it. In addition those implementing change must also guard against false clarity. Fullan (1982) indicated that "[false clarity] occurs when change is interpreted in an over simplified way; that is, the proposed change has more to it than people perceive or realize" (p. 58).

Input into change. School administrators as well as the primary operators of computer equipment need to be cooperatively involved and have meaningful input into changes which affect the way they do their work. While it is clearly impossible and not desirable for all school office computer users to be involved in planning, it is important that some opportunity for input be provided. As Dalziel and Schoonover (1988) indicated, "changes suit the change makers, not necessarily the people who have to live with them" (p. 4).

In addition, Fullan (1982) indicated that:

> One of the basic reasons why planning fails is that planners or decision-makers of change are unaware of the situations which potential implementors are facing. They introduce changes without providing a means to identify and confront the situational constraints, and without attempting to understand the values, ideas and experiences of those who are essential for implementing any changes. (p. 83)

Moreover, Fullan (1982) indicated:

> Innovators need to be open to the realities of others: sometimes because the ideas of others will lead to alterations for the better in the direction of change, and sometimes because the others' realities will expose the problems of implementation which must be addressed and at the very least will indicate where one should start. (p. 82)

Thus, it is recommended that the central office personnel in charge of administrative computing encourage and provide opportunity for computer users at all levels to propose changes, assist in the development and selection of software applications, and be involved in the evaluation, piloting, and implementation of new programs. This is consistent with an information centre approach to support services in which user involvement is important in developing systems that users will have confidence in and operate successfully. This approach promotes a feeling of ownership among users and results in a stronger commitment to making the proposed change work (Mankin et al. 1988).

Increasing expectations. Before and during the implementation of a change, it is recommended that jurisdictions need to understand and monitor the demands, responsibilities and situational constraints faced by those who are most affected by change implementation. In the school setting, this relates particularly to the secretary who, as the primary computer operator, is the one whose job is most affected by computerization. As the job changes, so must the job description and the tasks undertaken. Present computer implementation tends to add new responsibilities without taking anything away. The computer is a tool which, when implemented, revolutionizes the way one's job is done. Therefore a re-evaluation of past practices in light of present capabilities is required in order that those practices which are no longer necessary might be identified and eliminated.

In addition, computing departments should be encouraged to adopt practices and applications which allow for and promote end user customizing and modification in order to meet the changing needs of the school and the jurisdiction.

Attitudes towards change. It is recommended that when jurisdictions begin a change that they should endeavor to actively sell the change to those most affected with the intent of cultivating positive attitudes towards it. In addition, as much information as possible should be provided regarding the immediate and long range impact of the change. With regard to communication and its effect on attitudes, Evans and Wilkinson (1983) stated that:

> Rather than simply introducing technological change as a management decision, many firms make special efforts to provide as much information as possible to staff about the equipment with the objective of "selling" the idea to them and gaining their early commitment. Indeed many companies stress the importance of a good communications system in influencing employee attitudes to technological change. It is also important that the information provided should give as wide a picture as possible of future plans as well as detailing immediate changes so that employees may be encouraged to accept change as a normal and continuing process.(p. 35)

In findings of the National Science Foundation study on the use of new computer systems and worker perception of computer impact and effectiveness (cited in Mankin et al., 1988), it was indicated that one of the best predictors of implementation success was "a positive orientation to change" (p. 76). Good communication not only serves to lay out for employees the intended direction in which the organization is intent on moving but also provides for opportunity to clarify misunderstandings, explains how end users will be affected, assists in cultivating a positive attitude toward the change and overall allows for a better understanding of the proposed change by all concerned. The lack of attention to this necessary area can lead to resistance to change. As Dalzeil and Schoonover (1988) have indicated, "lack of clarity about what to expect in the change effort is a prime cause of resistance to change" (p. 38). In addition, those responsible for implementing change must ensure that realistic implementation time-lines are in place and do all in their power to ensure that all barriers to a smooth and trouble free implementation are removed.

Training. With regard to training, it is recommended that jurisdictions provide a method for the evaluation of all training programs including those on the student records system. In addition, they should promote Continuing Education programs to prospective employees in an effort to provide them with the necessary computer skills before they are hired. The establishment of approved system-wide administrative personal computer software should be considered in order to ensure data compatibility between the central office and the schools and to facilitate the development of training programs designed to meet the specific needs of the system.

Training of school administration. Both large and small schools can benefit from a computer literate school administration. The benefits of a computer literate school administration are better long range planning, more time to work with people, the enhancement of the decision-making ability due to access to better information, and improved communication through use of electronic mail. Millar (1988) discussed school administrative uses of personal computers and the advantage of computer use by the school administrator and indicated that "an administrator's decision-making process is greatly enhanced by having quick access to more data" (p. 11). Several administrators from this study indicated that training of school administrators is necessary to gain a knowledge of what the computer is and is not useful for and in order to maximize its potential. Non-involvement of school administrative personnel can lead to poor utilization of computers both instructionally and administratively. In addition, there is an increased potential for school administration who lack computer training to be unable to access needed information due to the absence of the primary computer operator. While all school jurisdictions in the study have encouraged computer use, a lack of access to a computer, negative attitudes toward computer use, and lack of interest have all been indicated as reasons for a lack of administrative involvement. Fullan (1982), commenting on the role of the principal in the implementation of educational change, indicated that "all major research on innovation and school effectiveness shows that the principal strongly influences the likelihood of change"

(p. 71). Thus, it is vital to the successful implementation of school office computers that the active, positive support of the school principal be obtained. Those responsible for implementing change need to ensure that school administrators in general, and the principal in particular, are actively supportive of the proposed change in order that the maximum potential benefits of computerization are realized. Participation by school administration must be encouraged and actively developed. Miller (1988) stated that "administrators must strive to become at least minimally literate in the use of the new electronic tools" (p. 14). In addition, Radin and Greenberg (1983) stated that "to make educationally sound decisions regarding the acquisition and utilization of computers, it is essential that administrators and supervisors develop some degree of proficiency in computer literacy" (p. 6).

It is recommended that school jurisdictions actively strive to increase the number of computer literate school administrators. Several options exist for developing a computer literate school administration. The administrative use of the computer can be linked to one of the school administrator's responsibilities with at least one administrator in each school being required to have the skills necessary to operate the school's computer system. A second possibility involves an aggressive selling of the advantages of computer training coupled with incentives for those who get involved. A third option would be to require that all new administrators receive some computer training in conjunction with local administrative development training programs. Those established administrators who desire to receive training may also be accommodated by this approach. In addition, confrontation with established administrative personnel who choose to resist training and not become involved is avoided.

In order to adequately train school administrators, there is a need for opportunity and access to training programs specifically designed to suit their needs. Montgomerie and Richards (1988), in research on the use of integrated computerized administrative packages, noted that school administrators "feel there is a lack of opportunity to learn how to use such packages both before and after they are purchased" (p. 2). Ideally, this type of

program may be developed in conjunction with the training and development capabilities provided through an information centre approach to support services.

Training of secretaries. A person's view of training is subjective, depending on individual background, circumstances, and preferences. Thus, it is recommended that jurisdictions endeavor to offer a diversity of training experiences to provide effective training for all employees who may start out at the same point with respect to knowledge but, as time passes, develop different interests, levels of skill, and require different interventions to meet their needs. Hord et al. (1987) indicated that "a single, generalized training session prior to a new program's initial use is rarely adequate to ensure effective implementation no matter how 'comprehensive' or 'in depth' it is advertised to be" (p. 76). Fullan (1982) stated:

> Most forms of inservice training are not designed to provide the ongoing, interactive, cumulative learning necessary to develop new conceptions, skills, and behavior. Failure to realize that there is a need for inservice work during implementation is a common problem. No matter how much advanced staff development occurs, it is when people actually try to implement new approaches that they have the most specific concerns and doubts. It is thus extremely important that people obtain some support at the early stages of attempted implementation. (p. 66-67)

Those responsible for implementing initial school office computerization and ongoing changes need to provide inservice training and support for the computer operator prior to and during the implementation phase and also as future changes are made.

Suggestions for further research

This study lays the ground work and opens the door to other potential areas for future research. Possible questions which might be pursued include:

1. What effect is computerization having on the role of school-based support personnel and to what extent is it affecting the way in which their jobs are performed?
2. What training methodologies might be best utilized in order provide training for new personnel?

3. What benefits accrue to students as a result of the implementing of school office computerization?
4. How has computerization affected the role and job of the school administrator?
5. How might a jurisdiction implement an information centre approach to computer technology?

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Appendix A

Purpose of the study as explained verbally to participants

The purpose of the study is to understand and describe what impact current school administrative computer training and support structures and practices are having on you as a school office computer user. The study will look at how the initial computerization of the school office was accomplished and managed as well as dealing with ongoing change. In addition, it will seek to identify from your point of view as a computer user the issues and concerns with respect to the computerization of the school office.

You are asked to be involved in a semi-structured interview of approximately one hour in length which will elaborate on the following questions:

1. What training and support services are presently provided by school district data processing departments and to what extent do these services meet the needs of school-based computer users?
2. What are the concerns of school office computer users with respect to provision of training and support services?
3. How do existing school district data processing departments plan for and manage technological change, and what input is accorded to those who must implement the change?

Pseudonyms will be used for study locations and central office departments to protect sources. All data will be combined in the thesis in such a way as to prevent responses being attributed to any individual.

Do you have any questions?

Do you have any objections to the taping of the interview?

Your participation in this study is totally voluntary and you may decline to answer any question or terminate the interview at any time.

Appendix B: Interview Guide
Central Office Administrator

Demographics and Background Information

1. How long have you been in your present job?

2. What is your present title?

3. What are the responsibilities of your department?

4. What are computers being used for in school offices?

5. Are all schools on line to a central mainframe or do you rely on stand alone microcomputers?

Training Needs

6. Does your school board provide computer training for school office staff?

   Who receives this training? Secretaries, school administration or both?

   Where does your board direct office staff in order to learn the skills required to use the software and equipment provided?

   Does your board provide financial assistance for training?

   Has this method proved successful as far as you are concerned?

7. Describe for me how a typical training program is set up, using your most recent example if you like.

   Do you prepare your own training manuals?

   How long are most training sessions?

   Who does the training?

   What is their training background?

   What do you see are some of the strengths and weaknesses of your present training program?

8. Is follow-up provided after the conclusion of the training period?

   How is this accomplished?

9. Are training programs evaluated?

   How? By whom?

10. Are training programs repeated for new staff?

11. What would happen if the primary person in charge of computer operations in a particular school were to suddenly be transferred or quit their job?

    Are there additional trained staff that could take their place within that school?

    Are minimum numbers of trained staff established for each school office?

12. Are minimum standards of computer literacy required for new office staff, both administrative and secretarial?

13. Is supplemental training provided when software programs or computer equipment is enhanced or changed?

Support Service Needs

14. Will you describe the kind of support services you provide for school office computer users? (support services, hardware technical assistance, application development assistance, software consultants etc.)

    What kinds of services do you provide?

    Is there a formal policy statement describing what services are your department's responsibility?

    Do schools have a copy?

    Is there a designated person or persons who are responsible for dealing with users' hardware and software problems?

    Trouble hot line?
    Are they readily accessible and easy to get in touch with?

    What kind of technical background do these support staff have?

15. Do school office computer users know who they should call if they are experiencing hardware or software difficulties?

16. Do support staff visit school offices? e.g. software consultants?

    Feedback, trouble shoot, service call?

Changes

17. Whose responsibility is it for coming up with new computer applications for use in school offices?

    How are needs established?
    user complaints, new management
    directives, response to Alberta Ed.?

    Do people visit school offices? Why?

18. When developing, selecting or modifying software for use in school offices, are the school office staff involved?

    In all three cases?

    Do you develop any of your own software?

    Do you involve end users in prototyping?
    e.g. screen layouts etc.

19. Are schools encouraged to develop their own software applications? e.g. a Lotus or Excel inventory data base?

    Do schools require permission to
    purchase and implement new office
    software?

    Is there a consultant to help schools with
    the development and selection of
    software and hardware?

    How do you ensure the data is compatible
    for central office use?

20. How is feedback from users of hardware or software obtained? Dissatisfaction due to limitation, desire for more fields in a student data base Non-threatening manner?

21. From your point of view, what is required to successfully implement a new computer program or new hardware?

    How do you sell the change to office
    staff?

    Does the central office show strong support
    for the change?

    Are adequate resources e.g. staff,
    training, etc. provided to successfully
    implement the change?

Are the reasons, objectives, and benefits of a new or modified hardware or software innovation clearly explained to those who will use it?

Do you run pilot projects?

22. How often are software upgrades purchased and implemented?

Is additional training supplied?

Is upgrading mandatory across the system?

Is software compatibility mandatory across the system?

23. How do you encourage school office staff to be creative and explore the potential of the programs and equipment at their disposal?

Do they share ideas between schools?

Communication

24. Have you ever had to deal with office computer user's resistance to the implementation of hardware or software?

How did you deal with the resistance?

25. Are there any areas of frustration when dealing with school office computer users?

26. Are you satisfied with the degree of communication that exists between the data centre and school offices?

How is this accomplished?
(phone, letter, survey)
Advance notice?

27. As you reflect on your support services, what are some of the strengths and weaknesses which come to mind?

28. Would you comment on what you feel an ideal computer system would contain?

Appendix C: Interview Guide
School Administrator

Demographics and Background Information

1. How long have you been in your present position?

2. Do you personally use a computer in your job?

3. Did you have any computer skills before you came into this job?

4. What uses are computers being used for in this office?

Training Needs

5. Have you taken any computer training courses?

6. Does your school board provide computer training for administrative and office staff?

   If training is not provided, how does your board expect you to acquire the skills needed to do your job?

   Does your board provide financial assistance for training courses?

7. Will you describe for me your experiences and perceptions of the training courses offered by your board that you have taken?

   Are they one day workshops?

   Was any follow-up provided? e.g. Any contact to see how things were going after initial training?

   How was the speed at which the concepts were covered?

   Was the technical level of the language used by the instructor appropriate?

   Was opportunity provided for personal attention?

   Was hands on time provided to practice the new skills?

   Was training tailored to your work needs?

Was the class size appropriate?

From your view point was the training successful? Why or why not?

8. If for some reason the secretary in charge of operating the computer immediately left her job, how many others in the office would have the skills and knowledge to operate the computer in an effective manner?

Do you feel you have mastered the computer programs necessary for the running of this office?

To what do you credit your success?

Service Needs

9. When you encounter problems with a computer program or computer equipment, where do you turn?
Are manuals used?

Do you rely on others in the office or school?

Do you rely on individuals in other schools doing a similar job?

10. Does your board provide formal support services for its office computer users?

11. What services do they provide?

What services do you feel they should they provide?

12. Describe your experience when you sought help from the support staff.

Was the level of technical language used appropriate?

Was the interaction friendly?

Were they sympathetic to your problem?

Are they prompt and easy to get a hold of?

13. Are you encouraged to be creative and explore the potential of the programs and equipment you use?

14. When you see a task that you think might be done better or more efficiently by the computer, is there a formalized consultant who can provide you with the necessary assistance to help you with a new way of using existing computer programs or find a new one that might do the job ?

15. What do you see are the strengths and weaknesses of your present support services?

16. Do you have any suggestions that you believe might help improve computer use in your system?

Change

17. Describe how changes in computer programs and equipment are introduced by your board.

    Does the central office show strong support for the change?

    Do you or others in a similar position have any input into software selection or design?

    Are you involved in the selection of computer equipment chosen for your office?

    Is there good communication between you and the technical staff implementing change?

    Do those implementing change ask for your feedback regarding suggestions or problems experienced following the introduction of new software or equipment?

    Are adequate resources e.g. staff, training, etc. provided to successfully implement the change?

18. Are the reasons, objectives, and benefits of a change in computer equipment or software clearly explained to you?

    Do changes appear well thought out and planned?

    Examples?

19. From your perspective, what would the ideal computer system include?

    Are there any things that you wish you could do with your computer system that you cannot do now?

Communication

20. Do you feel there is adequate communication between the information services department and school office users?

    Would you elaborate?

    How might communication be improved?

Appendix D: Interview Guide
School Secretary

Demographics and Background Information

1. How long have you been in your present position?

2. How long has this job required the use of computer skills?

3. Did you have any computer skills before you came into this job?

4. What are computers being used for in this office?

Training Needs

5. Have you taken any computer courses?

6. Does your school board provide computer training for office staff?

   If training is not provided, how does your board expect you to acquire the skills needed to do your job?

   Does your board provide financial assistance for training courses?

7. Will you describe for me your experiences and perceptions of the training courses offered by your board that you have taken?

   Are they one day workshops?

   Was any follow-up provided? For example was there any contact to see how things were going after the training?

   How was the speed at which the concepts were covered?

   Was the technical level of the language used by the instructor appropriate?

   Was adequate opportunity provided for personal attention?

   Was hands on time provided to practice the new skills?

   Was training tailored to your work needs?

Was the class size appropriate?

From your viewpoint, was the training successful?

8. If for some reason you immediately left your job, how many others in the office in the office would have the skills and knowledge to operate the computer in an effective manner?

Do you feel you have mastered the computer programs necessary for the running of this office?

Support Service Needs

9. When you encounter problems with a software package or a piece of computer equipment, where do you turn?
Are manuals used?

To others in the office or school?

To individuals in other schools doing a similar job?

10. Does your board provide formal support services for its office computer users?

11. What services do they provide?

What services do you feel they should provide?

12. Describe your experience in seeking help from the support staff.

Was the level of technical language used appropriate?

Was the interaction friendly?

Were they sympathetic to your problem?

Are they prompt and easy to get a hold of?

13. Are you encouraged to be creative and explore the potential of the programs and equipment you use?

14. When you see a task that you think might be done better or more efficiently by the computer, is there a formalized consultant who can provide you with the necessary assistance to help you with a new way of using existing computer programs or find a new one that might do the job ?

15. What do you see are the strengths and weaknesses of your present support services?

16. Do you have any suggestions that you believe might help improve computer use in your system?

Change

17. Describe how changes in computer programs and equipment are introduced by your board.

    Does the central office show strong support for the change?

    Do you have any input into software selection or design?

    Is there good communication between you and the technical staff implementing change?

    Do those implementing change ask for your feedback regarding suggestions or problems experienced following introduction of new software or equipment?

    Are adequate resources e.g. staff, training, etc. provided to successfully implement the change?

18. Are the reasons, objectives, and benefits of a change in equipment or a computer program clearly explained to you?

    Do changes appear to be well thought out and planned?

    Examples?

    How might this be improved?

19. From your perspective, what would the ideal computer system include?

    Are there any things that you wish you could do with your computer system that you cannot do now?

Communication

20. Do you feel there is adequate communication between the information services department and school office users?

    Will you elaborate?

    How might communication be improved?